

MOTOR AGE

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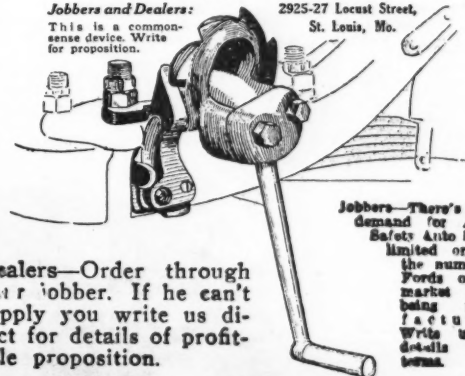
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MOTOR AGE

AUTOMOBILE SHOWS BACK TO PRE-WAR BASIS

BY DARWIN S. HATCH

(Managing Editor, Motor Age)

WITH the opening of the Twentieth National Automobile Show at New York Saturday, the show season returns to its accustomed program after the disarrangement caused by the unstable condition of a year ago. The 1920 show calendar presents much the same characteristics, except that it is somewhat fuller than it has been in previous years with the exception of the 1919 season.

Last year it will be remembered, the show season started almost a month late and began with Chicago's exhibition at the Coliseum and Armory, followed by the New York show a week later. In fact, there were two or three important curtain raisers to the season even before the Chicago show. Los Angeles, Dallas and Spokane put on exhibitions last year in the early part of January which preceded the two National shows generally assumed to open the season.

Opening of the New York show likewise marks the return this year of the National Automobile Chamber of Commerce as a promotor of the two great national shows at Chicago and New York. These two exhibi-

tions last year were promoted by local dealers' organizations, the Chicago Automobile Trade Association and the Automobile Dealers' Association, New York, because the national association of manufacturers did not consider it wise to attempt to promote a show under the conditions existing at that time.

Nevertheless, New York and Chicago dealers had the hearty co-operation of the N.A.C.C. in the staging of their exhibition, and the Chicago event was managed by the veteran showman, Samuel A. Miles, show manager of the N. A. C. C. Mr. Miles, of course, has the direct management of both the national shows this year. We have this year, also, the return of the New York show to its former site, the Grand Central Palace, which was unavailable last year because it was being used for military purposes. In its stead last season the old Madison Square Gardens, which housed the first New York show twenty years ago, was brought back into the limelight.

This year's exhibition at New York also marks the re-



Grand Central Palace, where the New York passenger car show is held this season. Five floors are devoted to the exhibitions this year, which is under the auspices of the National Automobile Chamber of Commerce and managed by Samuel A. Miles

The New York Shows at a Glance

PASSENGER CAR DIVISION

Opening Date—Saturday, January 3, at 2:00 p. m.

Open daily thereafter except Sunday, through January 10, 10 a. m., to 10:30 p. m.

Auspices of National Automobile Chamber of Commerce.

Location—Grand Central Palace, 4 lower floors.

No. of Exhibitors of Passenger Cars—84.

No. of Exhibitors of Accessories, Parts and Sundries—227.

Manager—Samuel A. Miles.

Show Committee—John N. Willys, Chairman, Willys Overland Company; H. G. Root, Westcott Motor Car Company; Harry M. Jewett, Paige-Detroit Motor Car Company.

Highest Priced Car—Over \$11,000.

Lowest Priced Car—\$715.

MOTOR TRUCK DIVISION

(Highway Transport Conference in Conjunction)

Opening Date—Saturday, January 3, at 2 p. m.

Open daily thereafter except Sunday, through January 10, 10:00 a. m. to 10:30 p. m.

Auspices of National Automobile Chamber of Commerce.

Location—8th Coast Artillery Armory, Jermoe Ave., Kingsbridge Road & 194th Street, Main Drill Floor.

Number of Exhibitors of Motor Trucks—69.

Number of Exhibitors of Accessories, Parts & Sundries (including Trailers and Bodies)—69.

Manager—S. A. Miles.

Show Committee—M. L. Pulcher, Chairman, Federal Motor Truck Co.; A. J. Whipple, Diamond T Motor Car Co.; David Ludlum, Autocar Company.

Prices of Trucks—\$935 up.

turn of commercial vehicles as a distinct part of the display. Several years ago when the number of passenger cars at the exhibit became so great that it became impossible to provide room for the trucks in the same building the method was adopted of having the passenger cars on exhibition only, and the trucks shown later. This year by using two buildings it is possible to show the passenger cars and trucks simultaneously, the former in the Grand Central Palace, and the later in the Eighth Coast Artillery Armory.

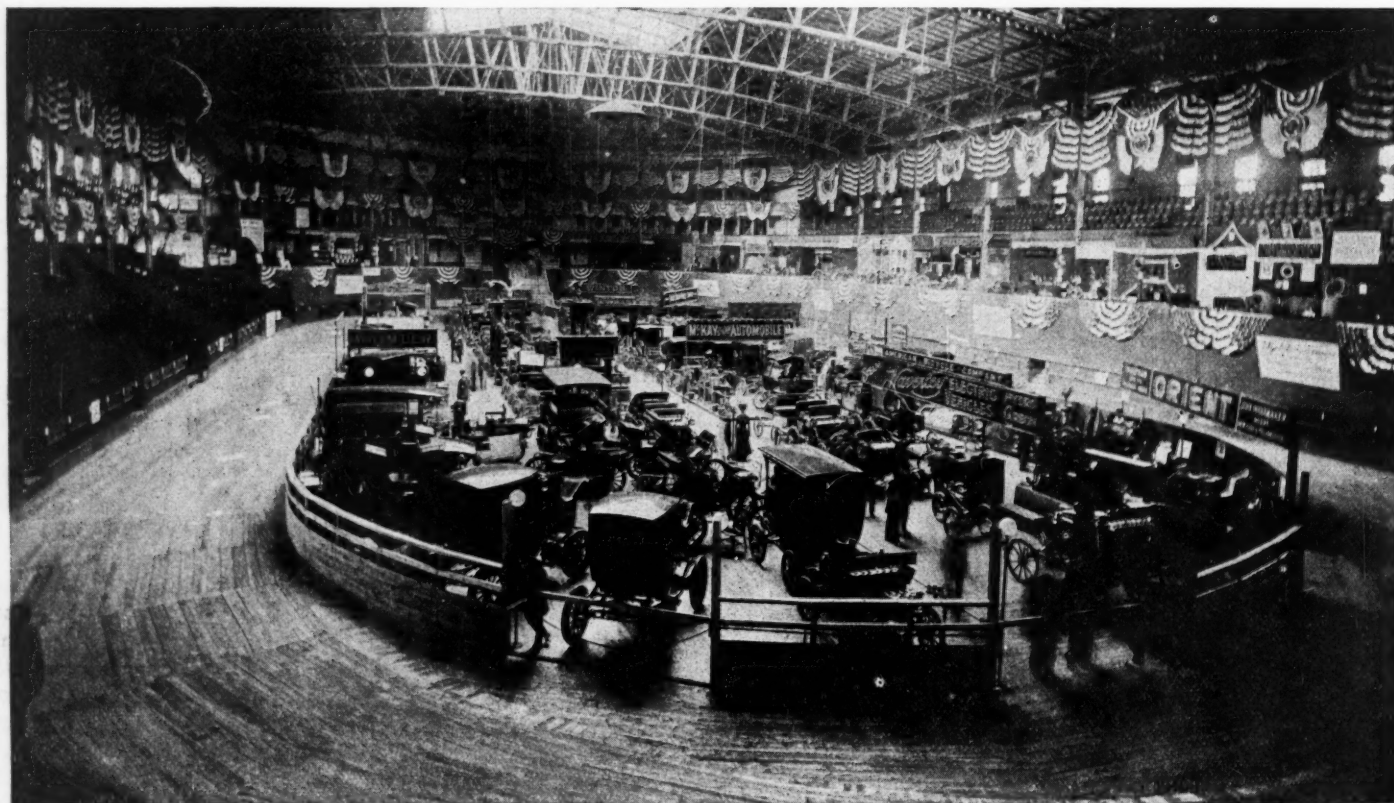
Same method is being employed at Chicago where the passenger cars will be displayed in the Coliseum as of old and the trucks will be on view at the International Amphitheater at the Stock Yards.

Both passenger car and truck exhibits at New York open Saturday, January 3 and continue until the following Saturday, January 10. There will be a larger number of passenger cars on exhibition than last year, this year's number of makers exhibiting being 84, as against 60 on view last year. This does not mean that there are a great many new manufacturers in the field, although there are a few, but the reason is that the show, coming so soon after the signing of the armistice, left the manufacturers without definite plans for production or new models to exhibit.

As usual, decorations at the Grand Central Palace will not be elaborate, although the effect will be that of completeness. This is made possible by the

fact that the architectural scheme and permanent decoration of the Grand Central Palace itself is such that there is no need of complete covering with special decorations that is necessary in the Coliseum or the Madison Square Gardens. As in the past, the first four floors of the Palace will be devoted to exhibition of cars and accessories, exhibitors of the latter being assured a large representation of visitors by the custom of the management in running the elevators, express to the fourth floor and forcing all fourth floor visitors to walk down so that all floors are sure to be in the line of travel.

In addition there will be several outside independent exhibits, the most important of which will be that of the Independent Exhibition Co., which has



An old photograph of the first New York automobile show. The track was used to prove to Doubting Thomases that the cars really would run

Calendar of Events During Week of New York Shows

Saturday, January 3

2:00 P. M.—Passenger Car Show Opening—Four floors, Grand Central Palace.

2:00 P. M.—Motor Truck Show Opening—8th Coast Artillery Armory.

8:15 P. M.—Highway Transport Conference—8th Coast Artillery Armory.

Monday, January 5

10 A. M.-10:30 P. M.—Passenger Car Show and Motor Truck Show.

2:15 P. M.—Highway Transport Conference session—"Merchandising Motor Trucks."

8:15 P. M.—Highway Transport Conference session—"Motor Vehicles in Passenger Transportation."

2:00 P. M.—Meeting Automotive Service Association, Automobile Club of America.

Dinner, Rubber Association of America—Waldorf Hotel.

Tuesday, January 6

10 A. M.-10:30 P. M.—Passenger Car Show and Motor Truck Show.

2:15 P. M.—Highway Transport Conference session—"Smoothing the Path of the Motor Truck."

8:15 P. M.—Highway Transport Conference session—"Increasing Motor Haulage Efficiency."

10 A. M.—Meeting of Motor Truck Committee—National Automobile Chamber of Commerce, Inc.

10 A. M. and 2 P. M.—Meeting of Standard Committee, Society of Automotive Engineers, Engineering Societies Building.

7 P. M.—Dinner, National Automobile Chamber of Commerce—Hotel Commodore.

Wednesday, January 7

10 A. M.-10:30 P. M.—Passenger Car Show and Motor Truck Show.

2:15 P. M.—Highway Transport Conference session—"Selling on the Firing Line."

8:15 P. M.—Highway Transport Conference session—"Rural Motor Express."

9:30 A. M.—Meeting of Executive Committee, Motor & Accessory Manufacturers' Association, at offices of Association, Aeolian Building.

10:00 A. M.—Meeting of Directors, National Automobile Chamber of Commerce.

10:00 A. M.—Meeting of Finance Committee, Motor & Accessory Manufacturers' Association, at offices of Association, Aeolian Building.

10:00 A. M.—Business session, Society of Automotive Engineers.

11:00 A. M.—Meeting of Board of Directors, Motor & Accessory Manufacturers' Association, offices of Association, Aeolian Building.

12:30 P. M.—Luncheon and Meeting, National Automobile Show Managers' Association at headquarters of Automobile Dealers' Association.

1:00 P. M.—Luncheon, Professional session of Society of Automotive Engineers.

2:00 P. M.—Professional session of Society of Automotive Engineers, Auditorium Engineering Societies Building.

3:00 P. M.—Sixteenth Annual Meeting of Motor and Accessory Manufacturers' Association, Hotel Commodore.

3:00 P. M.—Meeting of Service Committee, National Automobile Chamber of Commerce.

7:30 P. M.—Twelfth Annual Banquet of Motor and Accessory Manufacturers' Association, Grand Ball Room, Hotel Commodore.

Association, Grand Ball Room, Hotel Commodore.

9:00 P. M.—Carnival Night, Society of Automotive Engineers, Hotel Astor.

Thursday, January 8

10:00 A. M.-10:30 P. M.—Passenger Car Show, and Motor Truck Show.

2:15 P. M.—Highway Transport Conference session—"In the matter of Service."

8:15 P. M.—Highway Transport Conference session—"Aids to Motor Truck Efficiency."

10:00 A. M.—Meeting of Advertising Managers, National Automobile Chamber of Commerce.

10:00 A. M. and 2:00 P. M.—Fuel and Research Professional session, Society of Automotive Engineers, Auditorium Engineering Societies' Building.

1:00 P. M.—Society of Automotive Engineers' luncheon.

2:30 P. M.—Meeting of Board of Directors of Motor and Accessory Manufacturers' Association, offices of Association, Aeolian Building.

7:00 P. M.—Society of Automotive Engineers' Dinner, Hotel Astor.

Friday, January 9

10:00 A. M.-10:30 P. M.—Passenger Car Show and Motor Truck Show.

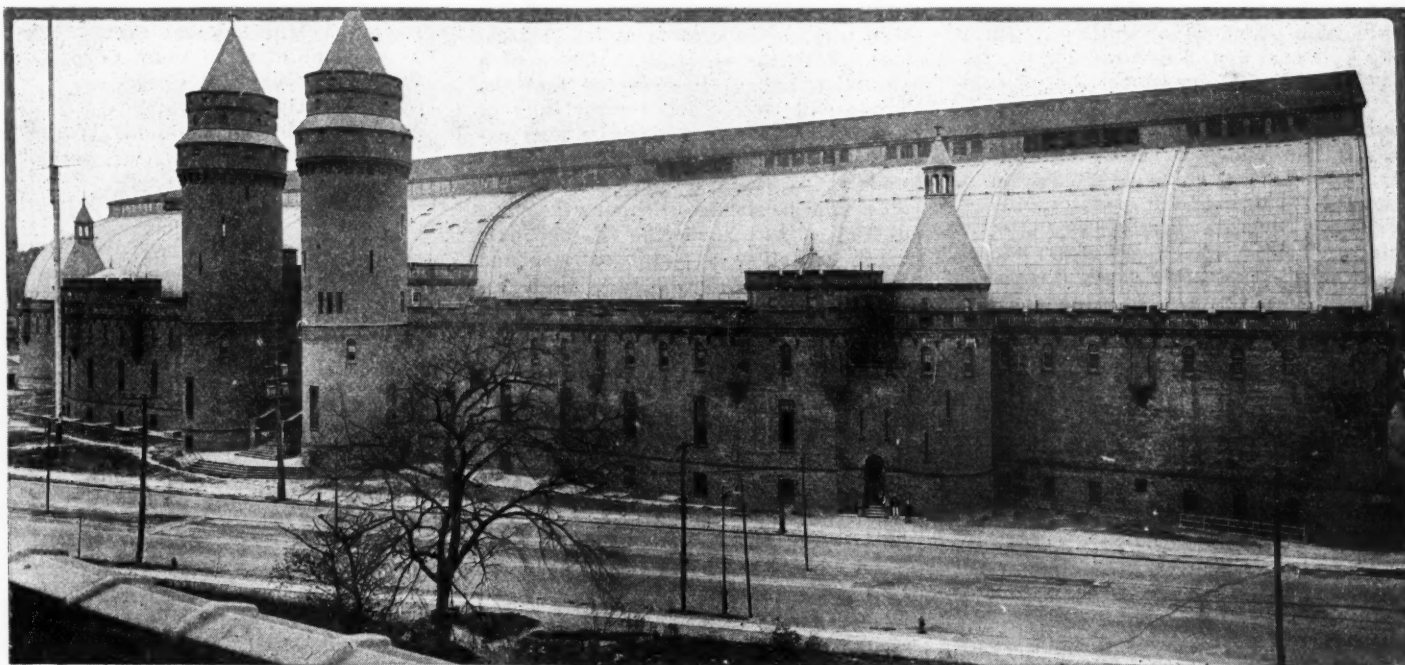
2:15 P. M.—Highway Transport Conference session—"Selling Motor Transportation."

8:15 P. M.—Highway Transport Conference session—"Motor Truck and Railroad Freightage."

Saturday, January 10

10:00 A. M.-10:30 P. M.—Passenger Car Show and Motor Truck Show.

3:15 P. M.—Highway Transport Conference session, "Highways and Motor Transport."



Eighth Coast Artillery Armory, the site of New York's truck show

taken over the 69th Regiment Armory across the street from the Madison Square Gardens and which housed the overflow from that building last year. This provides 30,000 sq. ft. of floor space and is being allotted to exhibitors who failed to get into the Grand Central Palace. It is not, however, connected with the National Show.

Individual exhibits at the larger hotels will be numerous. One of these which will create interest is at the Commodore Hotel, where the new LaFayette, the production of the Indianapolis concern headed by Nash, and D. McCall White, is to be shown. A LaFayette touring car is now being tested on the Indianapolis speedway and one of their sedans is being driven overland to arrive at the salon show week.

One of the meetings of utmost importance will be the convention of service managers meeting and dinner under the auspices of the Automotive Service Association of New York and the Automotive Service Managers' Association of Newark. While these two organizations are local the meeting will be attended by service men from all over the country and will be national in its scope.

Among the other organizations that have scheduled meetings during that time are the National Automobile Chamber of Commerce, the Society of Automotive Engineers, the Automobile Club of America, the Rubber Association of America, the Motor and Accessory Manufacturers' Association, the National Automobile Show Managers' Association, as well as the large number of meetings and dinners

given by manufacturers to their dealers.

Lunches and dinners are on the program for several days during the week. On Monday the Rubber Associations of America will dine at the Waldorf Hotel. The annual dinner of the N. A. C. C. will be given on Tuesday at the Commodore. Wednesday schedules a luncheon and meeting the National Automobile Show Managers' Association at the headquarters of the Automobile Dealers' Association; luncheon in connection with the professional section of the S. A. E. The twelfth annual banquet of the Motor and Accessory Manufacturers Association at the Commodore and Carnival night of the Society of Automotive Engineers at the Hotel Astor. The S. A. E. schedules its annual dinner at the Astor that night.

Highway Transport Has Service Day

One of the most important events of the week is the series of meetings of the Highway Transport conference, which will be held all week at the Eighth Coast Artillery Armory where the truck show is to be staged. This conference is of importance not only on account of its probable results, but also because the fact that it has been given so much time during that busy week indicates how important highway transports is becoming in the minds of the industry. This conference also is to be a feature of the Chicago show week.

An idea of some of the subjects to be taken up at the Highway Transport Conference is given by a list of the topics of discussion. These include: Merchandising Motor Trucks, Motor Vehicles and Tractor Transportation, Smoothing the Path

of the Motor Truck, Increasing Motor Haulage Efficiency, Selling on the Firing Line, Rural Motor Express. In the Matter of Service, Aids to Motor Truck Efficiency, Selling Motor Transportation, Motor Truck and Railroad Freight Highways and Motor Transports.

Some of the speakers who are to be heard during the Highway Transport Conference are F. W. A. Vesper, President National Automobile Dealers' Association; Ray Sherman, Editor of Motor World; S. N. Williams, Chairman Federal Highway Council; Doctor P. P. Claxton, Commissioner of Federal Bureau of Education.

It is to be expected that many manufacturers will withhold announcement of their new 1920 models until just about show time. This means that January 1st sees a number of important manufacturers unveiling their new designs. Consequently, MOTOR AGE offers on the following pages the very first illustrations and descriptions of a number of these new cars. Space does not permit complete descriptions of all of them, nor does it permit that all of them be represented here. Other new cars which will make their first appearance at New York will be described briefly and illustrated in MOTOR AGE issue of January 8th, as will a number of the new accessories seen for the first time at the show. Complete representation of all manufacturers with full specifications and illustrations of body types of all manufacturers together with short descriptions of the product of all passenger car manufacturers will appear in MOTOR AGE issue of January 29th.

Chicago Aircraft Show Opens January 8

CHICAGO, Jan. 1—Success seems assured for Chicago's first aeronautical exhibition which is scheduled to open at the Coliseum Jan. 8 and run for the following week. Every square foot of exhibition space has long ago been taken by members of the Manufacturers' Aircraft association and the show management has promised a complete exhibition of the 1920 models of the industry.

This is Chicago's first venture into the aircraft field, although one of the leading passenger car dealers here, the James Levy Motors Co., has had the distribution for aircraft in the Chicago territory for several months. When the show was first proached it attracted only minor interest, but as the date set for the exhibition approaches, it seems certain there will be a big attendance.

Chicago has been more backward in aviation than the large eastern cities. Lack of a suitable landing ground for planes has forced flyers to forego visits to Chicago as much as possible and the sight of a plane is still uncommon enough here to make the "man in the street" risk a few cricks in his neck to watch its maneuvers.

Already the interest in the coming

exhibits has begun to manifest itself in numerous ways and the chances are that there will be big crowds at all the sessions. Like the automobile shows of a generation ago, it is expected that the crowds will be composed principally of curiosity seekers, but there is also expected to be a fair sprinkling of persons intending to purchase machines.

The aircraft show will occupy the same building as will house the Chicago passenger car show a fortnight later and immediately the planes have been removed after January 15, workmen will start the decorations for the forthcoming automobile exhibition.

In addition to American exhibits, there will be models of several foreign planes and the Goodyear Co. will exhibit its latest type of dirigible. The Army and Navy Aerial Mail and Signal Corps will also maintain interesting exhibits. Capt. Eddie Rickenbacker's Spad also is to be shown for the first time in the United States.

List of Exhibitors

Following is a list of the exhibitors:
United Aircraft, Inc.
Goodyear Tire & Rubber Co.

Packard Motor Car Co.
Curtiss Aeroplane & Motor Corp.
Dayton-Wright Airplane Co.
Aeromarine Plane & Motor Corp.
Wright Aeronautical Corp.
Gallaudet Aircraft Corp.
American Aircraft & Supply Works.
Interallied Aircraft Corp.
U. S. Army.
U. S. Navy.
U. S. Aerial Mail Service.
Arthur Johnson Mfg. Co.
Everyday Engineering Magazine.
Tale Spins, 510 Fannin St.
John A. Roebling Sons Co.
Floyd Smith Aerial Equipment Co.
Brewster-Goldsmith Corp.
Morris S. Wetzel.
D. G. Cantu (Caproni).
Aerial Age, Foster Bldg.
Gardner-Moffat Co.
Thos. F. Hamilton.
Essankay Products Co.
Edstrom Machinery Co.
Wixon Products.
Whittemore-Hamm Co.
Van Schaack Bros. Chemical Works.
Aero Club of Ill.
Aviation Club of Chicago.
Ill. Model Aero Club.

Passenger Car Exhibitors at New York and Chicago

Name	Company	Address
Allen	Allen Motor Co.	Columbus, Ohio
American Beauty	Pan-American Motors Corp.	Decatur, Ill.
Anderson	Anderson Motor Co.	Rock Hill, S. C.
Apperson	Apperson Bros. Automobile Co.	Kokomo, Ind.
Auburn	Auburn Automobile Co.	Auburn, Ind.
Biddle	Biddle Motor Car Co., Inc.	Philadelphia, Pa.
Briscoe	Briscoe Motor Corp.	Jackson, Mich.
Buick	Buick Motor Co.	Flint, Mich.
Cadillac	Cadillac Motor Car Co.	Detroit, Mich.
Case	J. I. Case T. M. Co.	Racine, Wis.
Chalmers	Chalmers Motor Co.	Detroit, Mich.
Chandler	Chandler Motor Car Co.	Cleveland, Ohio
Chevrolet	Chevrolet Motor Car Co.	New York, N. Y.
Cleveland	Cleveland Automobile Co.	Cleveland, Ohio
Cole	Cole Motor Car Co.	Indianapolis, Ind.
Columbia	Columbia Motors Co.	Detroit, Mich.
Comet	Comet Automobile Co.	Decatur, Ill.
Commonwealth	Commonwealth Motors Co.	Chicago, Ill.
Crow-Elkhart	Crow-Elkhart Motor Co.	Elkhart, Ind.
Davis	Geo. W. Davis Motor Car Co.	Richmond, Ind.
Detroit Electric	Anderson Electric Car Co.	Detroit, Mich.
Dixie Flyer	Dixie Motor Car Co., Inc.	Louisville, Ky.
Dodge Bros.	Dodge Bros.	Detroit, Mich.
Dorris	Dorris Motor Car Co.	St. Louis, Mo.
Dort	Dort Motor Car Co.	Flint, Mich.
Elcar	Elkhart Carriage & Motor Car Co.	Elkhart, Ind.
Elgin	Elgin Motor Car Co.	Chicago, Ill.
Fiat	F. I. A. T.	New York City
Franklin	H. H. Franklin Mfg. Co.	Syracuse, N. Y.
Grant	Grant Motor Car Corp.	Cleveland, Ohio
Haynes	Haynes Automobile Co.	Kokomo, Ind.
Hollier	Lewis Spring & Axle Co.	Chelsea, Mich.
Holmes	Holmes Automobile Co.	Canton, Ohio
Hudson	Hudson Motor Car Co.	Detroit, Mich.
Hupmobile	Hupp Motor Car Corp.	Detroit, Mich.
Jackson	Jackson Automobile Co.	Jackson, Mich.
Jordan	Jordan Motor Car Co.	Cleveland, Ohio
King	King Motor Car Co.	Detroit, Mich.
Kissel Kar	Kissel Motor Car Co.	Hartford, Wis.
Kline Kar (N. Y.)	Kline Car Corp.	Richmond, Va.
Leach	Leach-Biltwell Co.	Los Angeles, Cal.
Lexington	Lexington Motor Co.	Connersville, Ind.
Liberty	Liberty Motor Car Co.	Detroit, Mich.
McFarlan	McFarlan Motor Co.	Connersville, Ind.

NAME	COMPANY	ADDRESS
Maibohm	Maibohm Motors Co.	Sandusky, Ohio
Marmon	Nordyke & Marmon Co.	Indianapolis, Ind.
Maxwell	Maxwell Motor Co.	Detroit, Mich.
Mercer	Mercer Automobile Co.	Trenton, N. J.
Metz	Metz Co.	Waltham, Mass.
Milburn Electric	Milburn Wagon Co.	Toledo, Ohio
Mitchell	Mitchell Motors Co.	Racine, Wis.
Moline-Knight	Root & Van Dervoort Eng. Co.	East Moline, Ill.
Monitor	Monitor Motor Car Co.	Columbus, Ohio
Monroe	William Small Co.	Indianapolis, Ind.
Moon	Moon Motor Car Co.	St. Louis, Mo.
Nash	Nash Motors Co.	Kenosha, Wis.
National	Natl. Motor Car & Vehicle Corp.	Indianapolis, Ind.
Oakland	Oakland Motor Car Co.	Pontiac, Mich.
Oldsmobile	Olds Motor Works	Lansing, Mich.
Olympian	Olympian Motors Co.	Pontiac, Mich.
Overland	Willys-Overland Co.	Toledo, Ohio
Owen-Magnetic	Baker R. & L. Co.	Cleveland, Ohio
Packard	Packard Motor Car Co.	Detroit, Mich.
Paige	Paige-Detroit Motor Car Co.	Detroit, Mich.
Paterson	W. A. Paterson Co.	Flint, Mich.
Peerless	Peerless Motor Car Co.	Cleveland, Ohio
Pierce-Arrow	Pierce-Arrow Motor Car Co.	Buffalo, N. Y.
Pilot (C)	Pilot Motor Car Co.	Richmond, Ind.
Premier	Premier Motor Corp.	Indianapolis, Ind.
R. & V. Knight	Root & Van Dervoort Eng. Co.	Moline, Ill.
Reo	Reo Motor Car Co.	Lansing, Mich.
Roamer	Barley Motor Car Co.	Kalamazoo, Mich.
Saxon	Saxon Motor Car Corp.	Detroit, Mich.
Sayers	Sayers & Scovill Co.	Cincinnati, Ohio
Scripps-Booth	Scripps-Booth Corp.	Detroit, Mich.
Standard	Standard Steel Car Co.	Pittsburgh, Pa.
Stanley	Stanley Motor Carriage Co.	Newton, Mass.
Stearns-Knight	F. B. Stearns Co.	Cleveland, Ohio
Stephens Six	Moline Plow Co., Stephens Motor Branch	Moline, Ill.
Stevens-Duryea	Stevens Duryea Co.	Chicapee Falls, Mass.
Studebaker	Studebaker Corp.	South Bend, Ind.
Stutz	Stutz Motor Co.	Indianapolis, Ind.
Templar	Templar Motors Corp.	Cleveland, Ohio
Vellie	Vellie Motors Corp.	Moline, Ill.
Westcott	Westcott Motor Car Co.	Springfield, Ohio
Willys-Knight	Willys-Overland Co.	Toledo, Ohio
Winton	Winton Co.	Cleveland, Ohio

Cars marked (N. Y.) show at New York only; cars marked (C.) show at Chicago only.

Truck Exhibitors at New York and Chicago Shows

NAME	COMPANY	ADDRESS
Acason	Acason Motor Truck Co.	Detroit, Mich.
Acme	Acme Motor Truck Co.	Cadillac, Mich.
All-American (C)	All-American Truck Co.	Chicago, Ill.
Ace	American Motor Truck Co.	Newark, Ohio
Armleder (C)	The O. Armleder Co.	Cincinnati
Armleder (N. Y.)	Armleder Sales & Serv. Co.	New York
Atterbury	Atterbury Motor Car Co.	Buffalo, N. Y.
Autocar	Autocar Co.	Ardmore, Pa.
Bethlehem	Bethlehem Motors Corp.	Allentown, Pa.
Brockway (N. Y.)	Brockway Motor Truck Co.	Cortland, N. Y.
Clydesdale	Clyde Cars Co.	Clyde, Ohio
Commerce (N. Y.)	Commerce Motor Car Co.	Detroit
Corbitt (N. Y.)	Corbitt Motor Truck Co.	Henderson, N. C.
C. T. (N. Y.)	Commercial Truck Co. of America	Philadelphia, Pa.
Defiance	Turnbull Mot. Trk. & Wag. Company	Defiance, Ohio
Denby	Denby Motor Truck Co.	Detroit
Dependable (C)	Dependable Truck & Tractor	Galesburg, Ill.
Diamond T	Diamond T Motor Car Co.	Chicago
Dodge Brothers	Dodge Brothers	Detroit
Dorris	Dorris Motor Car Co.	St. Louis
Federal	Federal Motor Truck Co.	Detroit, Mich.
F. W. D. (N. Y.)	Four Wheel Drive Motor Truck	Webberville, Mich.
Garford	Garford Motor Truck Co.	Lima, Ohio
Gary (C)	Gary Motor Truck Co.	Gary, Ind.
Gramm-Bernstein	Gramm-Bernstein Motor Truck	Lima, Ohio
Hendrickson (C)	Hendrickson Motor Truck Co.	Chicago, Ill.
Huffman	Huffman Bros. Motor Co.	Elkhart, Ind.
Indiana	Indiana Truck Corp.	Marton, Ind.
International	International Harvester Corp.	Chicago
Jackson	Jackson Automobile Co.	Jackson, Mich.
Jumbo	Nelson Motor Truck Co.	Saginaw, Mich.
Kalamazoo (C)	Kalamazoo Motors Corp.	Kalamazoo, Mich.
Kelly (N. Y.)	Kelly & Springfield Mot. Truck	Springfield, Ohio
Kissel (N. Y.)	Kissel Motor Car Co.	Hartford, Wis.
Koehler (N. Y.)	H. J. Koehler Motors Corp.	Newark, N. J.
Maccar	Maccar Truck Co.	Scranton, Pa.
Master	Master Trucks, Inc.	Chicago
Maxwell	Maxwell Motor Co.	Detroit

TRAILERS ON FLOOR WITH TRUCK EXHIBITS.

Fruehauf (C)	Fruehauf Trailer Co.	Detroit
Hitchy Trailer (N. Y.)	Hayes-Defender Co., Inc.	New York

BODIES ON MAIN FLOOR WITH TRUCK EXHIBITS

Metropolitan Body Co., Inc., (N. Y.)	Bridgeport, Conn.
Parry Mfg. Co.	Indianapolis

Cars marked (N. Y.) exhibited only at New York Show; cars marked (C.) exhibited only at Chicago Show.

NAME	COMPANY	ADDRESS
Nash	Nash Motors Co.	Kenosha, Wis.
Obenchain-Boyer (C)	Obenchain-Boyer Co.	Logansport, Ind.
Oldsmobile	Olds Motor Works	Lansing, Mich.
Oneida	Oneida Motor Truck Co.	Green Bay, Mich.
Packard	Packard Motor Car Co.	Detroit
Paige	Paige-Detroit Motor Car Co.	Detroit
Parker (C)	Parker Motor Truck Co.	Milwaukee, Wis.
Patriot (C)	Hebb Motors Co.	Lincoln, Neb.
Pierce-Arrow	Pierce-Arrow Motor Car Co.	Buffalo
Rainier	Rainier Motor Corp.	Flushing, L. I.
Reo	Reo Motor Car Co.	Lansing, Mich.
Republic	Republic Motor Truck Co.	Alma, Mich.
Rowe (N. Y.)	Rowe Motor Mfg. Co.	Lancaster, Pa.
Sandow	Sandow Motor Truck Co.	Chicago
Sanford (N. Y.)	Sanford Motor Truck Co.	Syracuse, N. Y.
Schact	G. A. Schact Motor Truck Co.	Cincinnati, Ohio
Schwartz (N. Y.)	Schwartz Motor Truck Co.	Reading, Pa.
Selden	Selden Motor Vehicle Co.	Rochester, N. Y.
Service (C)	Service Motor Truck Co.	Wabash, Ind.
Standard	Standard Motor Truck Co.	Detroit
Sterling (N. Y.)	Sterling Motor Truck Co.	Milwaukee, Wis.
Stewart (N. Y.)	Stewart Motor Corp.	Buffalo
Sullivan (N. Y.)	Sullivan Motor Truck Corp.	Rochester, N. Y.
Trailmobile	Trailmobile Co.	Cincinnati
Transport	Transport Truck Co.	Mt. Pleasant, Mich.
Three Point (N. Y.)	Three Point Truck Co.	Newark, N. J.
Triangle (N. Y.)	Triangle Motor Truck Sales Co.	New York
Union	Union Motor Truck Co.	Bay City, Mich.
Vellie	Vellie Motors Corp.	Moline, Ill.
Vim	Vim Motor Truck Co.	Philadelphia
Walker	Walker Vehicle Co.	Chicago
Walter	Walter Motor Truck Co.	New York
Ward (N. Y.)	Ward Motor Truck Co.	Mt. Vernon, N. Y.
Ward La France (N. Y.)	Ward La France Truck Co.	Elmira, N. Y.
Wilson	J. C. Wilson Co.	Detroit
Winther	Winther Motor Truck Co.	Kenosha, Wis.
Keystone (N. Y.)	Commercial Car Unit Co.	Philadelphia, Pa.

Warner Trailer	Warner Mfg. Co.	Beloit, Wis.
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Accessory Exhibitors at New York and Chicago Shows

NAME	N. Y. Passenger	Chi. Truck	N. Y. Passenger	Chi. Truck	NAME	N. Y. Passenger	Chi. Truck	N. Y. Passenger	Chi. Truck
A. B. C. Mfg. Co., New York.....	x				Champion Ignition Co., Flint, Mich.....	x	x		
Accurate System & Manifold Co., New York	x				Champion Mfg. Co., Chicago.....	x	x		
Acme Auto Accessories Co., Chicago.....		x			Chase, L. C. & Co., Boston, Mass.....	x	x		
Acme Die Casting Co., Brooklyn.....	x				Chicago Steel Wheel Co., Chicago, Ill.....	x	x		
Advance Auto. Accessories Corp., Chicago	x	x			Chilton Company, Philadelphia, Pa.....	x	x	x	x
Af-fordable Sales Corp., New York.....			x		Clark Equipment Co., Buchanan, Mich.....			x	x
Air Device Co., Chicago.....		x			Class Journal Co., New York.....	x	x	x	x
Alemite Die Casting & Mfg. Co., Chicago	x	x			Cleveland Heater Co., Cleveland, O.....	x			x
Alexander, J., Mfg. Co., New York.....	x				Coffield Tire Protector Co., Dayton, O.....	x			
Aluminum Brazing Solder Co., Philadelphia			x		Columbia Axle Co., Cleveland, O.....		x		
Aluminum Casting Co., Cleveland, O.....	x	x	x	x	Commercial Investment Trust, N. Y.....			x	
American Auto Lamp Co., Inc., N. Y.....	x				Compression Tube & Tire Corp., New York	x			
American Auto Digest, Cincinnati, O.....	x	x	x	x	Continental Auto Parts Co., Columbus,	x			
American Bosch Magneto Corp., Springfield, Mass.	x	x	x	x	Continental Motors Corp., Detroit.....	x	x	x	x
American Bureau of Engineering, Chicago	x	x			Copp, George W., Co., New York.....	x			
American Chain Co., Inc., Bridgeport, Conn.	x	x	x	x	Corbin Screw Corp., New Britain, Conn. (American Hardware Corp., Succ.)	x	x		
American Every Ready Wks., Long Island City, N. Y.....	x	x			Corcoran Mfg. Co., Cincinnati.....		x		
American Hammered Piston Ring Co., Baltimore	x	x			Corcoran-Victor Co., Cincinnati.....	x			
American Machine Co., Newark, Del.....			x	x	Cowles, C., & Co., New Haven, Conn.....	x	x		
American Pump & Tank Co., New York.....	x		x	x	Cramp, Wm., & Sons, Ship & Eng. Co., Philadelphia	x	x		
American Taximeter Co., New York.....		x	x		Cronk, E. D. & A. F., Inc., Utica, N. Y.....	x			
American Traction Ring Co., Inc., White Plains, N. Y.....			x		Curtiss Pneumatic Mach. Co., St. Louis	x	x		
Ames Co., F. A., Owensboro, Ky.....	x	x		x	Dayton Steel Foundry Co., Dayton, O.....			x	x
Anderson Elect. Specialty Co., Chicago	x		x		Defender Auto Lock Co., Inc., Detroit.....		x		
Apollo Magneto Corp., Kingston, N. Y.....		x	x		Derf Mfg. Co., New York.....	x			
Arc-o Mfg. Co., Inc., Chicago.....		x			Detloff Co., J. A., Detroit.....	x	x		
Arnold Electric Tool Co., New York.....	x				Detroit Carrier & Mfg. Co., Detroit.....		x		
Arrow Grip Mfg. Co., Glens Falls, N. Y.....	x	x	x	x	Detroit Pressed Steel Co., Detroit.....	x	x		
Asch & Co., Inc., New York.....	x				Dixon, Jos., Crucible Co., Jersey City, N. J.	x	x	x	x
Au-To Compressor Co., Wilmington, O.....	x	x			Doehler Die-Casting Co., Brooklyn, N. Y.	x	x		
Automatic Safety Tire Valve Corp., N. Y.	x				Dorr Miller Differential Co., New York	x	x		
Auto Journal Publ'g Co., Pawtucket, R. I.	x	x	x	x	Duff Mfg. Co., Pittsburgh, Pa.....	x	x		
Auto Pedal Pad Co., New York.....	x				Dunham, Thomas Co., Aurora, Ill.....	x	x		
Barnes Foundry Co., Jersey City, N. J.....	x				Duplex Engine Governor Co., Inc., Brooklyn			x	x
Barney's Auto Parts Co., New York.....	x				Detroit Steering Wheel Corp., Detroit	x	x		
Bausch Machine Tool Co., Springfield, Mass.		x			Eagle Puncture Proof Tire Co., New York			x	
Becker Bros., Chicago.....	x	x			E. A. Laboratories, Inc., Brooklyn N. Y.	x	x		
Bendus, J. V., Mfg. Co., Chicago.....			x	x	Eastern Machine Co., So. Easton, Mass.			x	x
Benjamin & Decker Mfg. Co., Baltimore, Md.	x	x			Eastern Rubber Co., Philadelphia.....	x	x		
Blackledge Mfg. Co., John W., Chicago	x	x			Eberhard Mfg. Co., Cleveland.....				x
Breeze Mfg. Co., Newark, N. J.....	x				Eclipse Machine Co., Elmira, N. Y.....	x	x		
Briscoe Devices Co., Jackson, Mich.....	x	x			Edelman & Co., E., Chicago.....		x		
Brown-Lipe Gear Co., Syracuse, N. Y.....	x	x			Edward Valve & Mfg. Co., Chicago.....				x
Brown-Lipe Gear Co., Syracuse, N. Y.....		x			Eisemann Magneto Co., Brooklyn, N. Y.....	x	x	x	x
Buda Co. Harvey Ill.....		x	x	x	Electric Storage Battery Co., Philadelphia	x	x		
Budd, Edward G., Mfg. Co., Philadelphia, Pa.	x				Empire Axle Co., Dunkirk, N. Y.....			x	x
Budd Wheel Corp., Philadelphia, Pa.....	x				English & Mersick Co., New Haven, Conn.	x			
Buell Mfg. Co., Chicago, Ill.....			x		Ericsson Mfg. Co., Buffalo, N. Y.....	x			x
Byrne, Kingston & Co., Kokomo, Ind.....	x	x	x	x	Essenkay Products Co., Chicago.....	x	x		x
Campbell, A. S., Co., Boston, Mass.....	x	x			Essex Rubber Co., Inc., Trenton, N. J.....	x			
Carbureter Mantle Co., New York.....	x				Everyday Eng. Magazine, New York.....	x	x		
Casco Mfg. Co., Thomasville, Ga.....	x	x			Fairbanks Company, New York.....	x	x		
Challoner Co., Oshkosh, Wis.....			x	x	Faw, J. H., Inc., New York.....	x			
					Fleckstein Visible Gasometer, Grand Rapids	x	x		

Accessory Exhibitors at New York and Chicago Shows (Continued)

NAME	N. Y. Passenger	Chi. Truck	N. Y. Passenger	Chi. Truck	NAME	N. Y. Passenger	Chi. Truck	N. Y. Passenger	Chi. Truck
Flint Motor Axle Co., Flint, Mich.....			x	x	Lambert Trublepruf Tire Co., Brook- lyn, N. Y.				x
Ford News Publishing Co., Long Island City	x	x			Lane Brothers Co., Poughkeepsie, N. Y.	x	x		
Franklin Mach. & Tool Co., Springfield, Mass.			x	x	Lauraine Magneto Co., New York.....			x	x
Fulton Co., Knoxville, Tenn.....	x	x			La Vietes, Geo. E., Inc., New York.....	x			
					Lawrence & Co., L., New York.....	x	x		
Gabriel Mfg. Co., Cleveland.....	x	x			Lee Mercantile, H. D., Co., Kansas City			x	
Gardner Governor Co., Quincy, Ill.....			x		Le Compte Co., Newark, N. J.....	x	x		
Gastine Co., Bridgton, N. J.....	x				Light Mfg. & Foundry Co., Pottstown, Pa.			x	
General Electric Co., Schenectady, N. Y.	x	x			Lightning Change Rim Corp., Chicago..	x	x		
Gill Mfg. Co., Chicago.....	x	x			Lipman Refrigerator Car & Mfg. Co., Beloit, Wis.	x	x		
Globe Mfg. Co., Battle Creek, Mich.....	x	x			Lobes Body Co., Inc., Mt. Vernon, N. Y.			x	
Gould Storage Battery Co., N. Y. C.....	x	x			Longdin Brugger Co., Fond du Lac, Wis.	x	x		
Gray & Davis, Inc., Boston, Mass.....	x	x	x	x	Lowe Motor Supplies Co., New York....	x			
Grundy Mfg. Corp., Detroit.....		x			Luthy Storage Battery Co., Newark, N. J.	x	x		
Guarantee Visible Measure Sales Co., Washington	x				Lyons Ignition Co., N. Y. C.....	x	x		
Hale & Kilburn Co., Philadelphia, Pa	x	x			M. & A. M. A. Office, New York.....	x	x	x	
Halladay Co., L. P., Streator, Ill.....		x			McCord Mfg. Co., Inc., Detroit.....	x	x		
Hart-Bell Co., Inc., New York.....	x	x			Marks, Paul M., Brooklyn.....	x			
Hartford, Edw. V., Inc., New York.....	x	x			McKinnon Dash Co., Buffalo.....	x	x		
Harvey Wheel Sales Co., New York....	x	x			McQuay-Norris Mfg. Co., St. Louis.....	x	x		
Hassler, Robert H., Indianapolis.....	x	x			Macbeth-Evans Glass Co., Pittsburgh...	x	x		
Hayes Wheel Co., Jackson, Mich.....	x	x			Manley Mfg. Co., York, Pa.....	x	x		
Heinze Electric Co., Lowell, Mass.....	x	x			Martin, James, New York.....	x	x		
Hercules Motor Mfg. Co., Canton, O....			x	x	Marlin Rockwell Corp., New Haven, Conn.	x			
Hero Mfg. Co., Philadelphia.....			x	x					
Heil Co., Milwaukee.....			x		Mead-Morrison Mfg. Co., East Boston, Mass.			x	x
Hi-Bolt Mfg. Co., Milwaukee.....			x	x	Merchant & Evans Co., Philadelphia...			x	x
Hobson Oil Co., New York.....	x	x			Merritt, S. W., Co., New York.....	x			
Holmes, George I., New York.....	x				Metal Stamping Co., Long Island City, N. Y.	x	x		
Holophone Glass Co., Inc., New York...	x				Militor Corp., Springfield, Mass.....	x	x		
Horizontal Hydraulic Hoist Co., Mil- waukee			x	x	Miller, Chas. E., New York.....	x			
Houpt Machine Co., Long Island City, N. Y.	x		x		Minneapolis Steel & Machinery Co., Minneapolis				x
Hoyt Elect. Instr. Co., Pencock, N. H....	x				Morand Cushion Vehicle Co., Chicago				x
Hudson Motor Specialties Co., Phila- delphia	x	x	x		Morse, Chain Co., Ithaca, N.Y.....	x	x		
Humil Corp., New York.....			x	x	Moto-Meter Co., Long Island City, N. Y.	x	x		
					Motor Car Supplies Co., Inc., New York	x			
Imperial Bross Mfg. Co., Chicago.....		x			Motor Compressor Co., Newark, N. J....	x	x		
Improved Gauge Mfg. Co., Syracuse, N. Y.	x	x			Motor Kleen Co., New York.....	x			
Inland Machine Works, St. Louis, Mo.	x	x			Motor Spark Plug Co., Newark, N. J....	x			
International Magazine Co., New York	x	x			Motor Vehicle Publishing Co., New York	x	x		
Iron City Products Co., Pittsburgh.....	x	x	x		Mutty, L. J., Co., Boston, Mass.....	x			
					Muzzy-Lyon Co., Ltd., Detroit.....	x			
Jaxon Steel Products Co., Jackson, Mich.			x	x					
Jiffy Jack Co., Cleveland, O.....	x	x			Nathan Novelty Mfg. Co., New York....	x			
John Thomson Press Co., New York....			x		City	x			
Johnson Auto Lock Co., Chicago.....	x	x			National Carbon Co., Cleveland, Ohio...	x	x		
Johnston, Wm. R., Mfg. Co., Chicago	x	x			National Clutch Co., Inc., Irvington, N. Y.	x	x		
					National Tube Co., Pittsburgh, Pa.....	x	x		
K. & P. Products, New York.....	x	x			National Wire Wheels Wks., Inc., De- troit	x	x		
K-W Ignition Co., Cleveland, O.....	x	x			New Era Spring Specialty Co., Grand Rapids, Mich.	x			
Kales Stamping Co., Detroit.....	x	x			New York Coil Co., New York.....	x	x		
Kellerman, I., Bronx, N. Y.....	x				Niehoff, Paul G., & Co., Chicago.....	x	x		
Kellogg Mfg. Co., Rochester, N. Y.....	x				Nobrac Co., New York.....	x			
Kent, Atwater Mfg. Co., Philadelphia, Pa.	x	x			Northwestern Chemical Co., Marietta, Ohio	x	x		
Keystone Rubber Mfg. Co., Erie, Pa....	x								
Klaxon Co., Newark, N. J.....	x	x			Oakes Co., Indianapolis, Ind.....		x		
La-Lo Chemical Co., Providence, R. I.	x								

Accessory Exhibitors at New York and Chicago Shows (Continued)

NAME	N. Y. Passenger	Chi. Truck	N. Y. Passenger	Chi. Truck	NAME	N. Y. Passenger	Chi. Truck	N. Y. Passenger	Chi. Truck
Pantasote Co., New York City.....	x	x	x	x	Stewart-Warner Speedometer Corp., Chicago	x	x		
Parker Axle & Prod. Corp., New York..			x	x	Story Rubber Corp., New York.....	x			
Parry Mfg. Co., Indianapolis.....	x	x	x	x	Stromberg Motor Devices Co., Chicago	x	x	x	x
Perfection Heater & Mfg. Co., Cleve- land, O.	x	x			Suderman Corp., Newburgh, N. Y.....	x	x		
Perkins Tonneau Windshield Co., New York	x				Superior Lamp Mfg. Co., Inc., New York	x			
Perma-Loc Mfg. Co., Wilkesbarre, Pa.			x		Thomas, C. B., New York.....	x			
Petroleum Motor Co., Chicago.....				x	Titeflex Metal Hose Corp., Newark, N. J.	x			
Phelps Mfg. Co., Columbus, O.....	x	x	x	x	Tonneau Shield Co., Inc., New York....	x	x		
Pittsburgh Model Eng. Co., Pittsburgh	x	x			Torbensen Axle Co., Cleveland.....			x	x
Pines Mfg. Co., Chicago.....	x	x			Trexler Co., Philadelphia.....	x	x		
Power Farming Press, St. Joseph, Mich.			x	x	Triplex Tire Corp., New York.....	x			
Powrlok Co., Cleveland.....	x	x			Truck Body Corp., New York.....			x	
Pratt, Wm. E., Mfg. Co., Chicago.....	x	x			Tuthill Spring Co., Chicago.....		x		
Presto Felt Mfg. Co., Inc., Toledo.....		x			Twin Fire Spark Plug Co., Detroit.....		x		
Prest-O-Lite Co., New York.....	x	x			United Mfg. & Distributing Co., Chi- cago	x	x		
Primolite Sales Co., Westfield, N. Y....	x	x			United States Air Compressor Co., Cleveland	x	x		
Radcliffe Turbin-Drive Co., Inc., New York	x	x			U. S. Light & Heat Corp., Niagara Falls, N. Y.	x	x		
Railway & Mill Supply Co., Chicago....		x			United States Specialty Co., Boston			x	
Rajah Auto Supply Co., Bloomfield, N. J.	x	x			United Laprobe Mfg. Co., Inc., New York	x			
Reliance Wheel Co., Youngstown, Ohio	x				Universal Eliminator Inc., New York....	x	x		
Republic Auto Parts Co., Long Island City, N. Y.....	x	x			Utilities Sales Corp., Philadelphia....	x	x		
Rex Mfg. Co., Connersville, Ind.....	x	x			Vacuum Oil Co., New York.....	x	x	x	
Rich Mfg. Co., New York.....	x				Van Sicklen Speedometer Co., Elgin, Ill.	x	x		
Rives, Geo. H., Mfg. Co., New York.....	x				Vaporizer Utilities Sales Corp., New York	x	x	x	x
Robertson Cradelock Wheel Co., Chi- cago			x		Veeder Mfg. Co., Hartford, Conn.....	x	x		
Rockwell Mfg. Co., College Point, L. I.	x				Waltham Watch Co., Waltham, Mass.	x	x		
Russell Motor Axle Co., Detroit.....			x	x	Wallace Mfg. Co., Newark, N. J.....		x		
Safety Nut & Bolt Co., Cleveland.....			x		Warner-Patterson Co., Chicago.....	x	x		
Saltsman, DeWitt G., Co., New Haven, Conn.	x				Wasson Piston Ring Co., Plainfield, N. J.	x			
Schrader's, A., Son, Inc., Brooklyn, N. Y.	x	x	x	x	Waukesha Motor Co., Waukesha, Wis....				x
Schutte, Charles, Body Co., Lancaster, Pa.	x				Weaver Mfg. Co., Springfield, Ill.....	x	x		
Searing Co., Lewis, Flint, Mich.....	x	x			Wellman-Seaver-Morgan Co., Akron, O			x	x
Sears Cross Co., Brooklyn, N. Y.....	x	x			West Steel Casting Co., Cleveland.....			x	x
Security Auto Theft Sys., New York....	x				Weston Electrical Inst. Co., Newark, N. J.	x			
Sedgwick Sales Co., Bronx, N. Y.....	x	x			Westinghouse Electric Mfg. Co., Pitts- burgh	x	x		
Service Engineering Co., New York....			x	x	Wheeler-Schebler Carburetor Co., Indi- anapolis	x	x	x	x
Sewell Cushion Wheel Co., Detroit.....			x		Whittington Mfg. Co., Montros, Pa....	x			
Shaler, C. A., Co., Waupun, Wis.....	x	x			Willard Storage Battery Co., Cleve- land	x	x		
Shontz, H. B., Co., Inc., New York.....	x				Wildenberg Bros., New York.....	x			
Silvex Company, Bethlehem, Pa.....	x				Williams, J. H., Co., Brooklyn.....	x	x		
Simms Magneto Co., East Orange, N. J.	x	x			Wilson, K. R., Buffalo, N. Y.....	x	x		
Sneed & Co., Iron Works, Inc., Jersey City, N. J.		x			Wire Wheel Corp. of America, Buf- falo	x	x		
Sparks-Withington Co., Jackson, Mich.	x	x			Wisconsin Motor Mfg. Co., Milwaukee..			x	x
Special Tool Engineering Co., Dayton, Ohio	x	x			Wittman Batteries Inc., New York.....	x			
Spencer Metal Products Co., Spencer, Ohio	x	x			Woodworth Mfg. Corp., Niagara Falls, N. Y.	x			
Spiro, C., Mfg. Co., New York.....	x				World Mfg. Co., Richmond Hill, N. Y..	x			
Splitdorf Electrical Co., Newark, N. J.	x	x	x	x	"X" Laboratories, New York.....	x	x		
S. S. White Dental Mfg. Co., New York	x	x			Yale & Towne Mfg. Co., Stanford, Conn.	x	x		
Standard Steel Castings Co., Cleveland			x	x	Zenith Carburetor Co., Detroit.....	x	x		
Stanley, John T., Co., Inc., New York....	x								
Stewart, F. W., Mfg. Co., Chicago.....	x								



EDITORIAL



Happy New Year—If You Make It So

THE year 1920 is going to be one of the greatest business years for the automotive dealers. It will be a successful year to big and small dealer alike, because factory production is gaining impetus every day and the industry as a whole is rapidly recovering from the temporary halt caused by war work, labor and fuel shortage. We must not begin where we left off in war days, but rather must project that time into the future and see what is before us.

THE dealers have gone through 1919 with flying colors for the most part and the race in 1920 is going to be swift and furious. This year the demand for cars will probably exceed the supply, but with the factories catching up in production dealers throughout the country may be able to satisfy the demands of their customers before the end of the year.

THE great thing for the dealer to bear in mind is that some time we shall have a situation where the supply of cars exceeds the demand. When that time comes dealers will be forced to sell cars whether they want to or not. It will be more than merely taking orders and promising delivery dates.

EVERY cloud has a silver lining. If by going through the period of reconstruction the dealer has learned to run his business better, to broaden his field of prospects by adding new forms of automotive equipment he is just that much better prepared for the attack in 1920 and the years after that. Although 1919 may have been overhung at times with dark clouds, back of those dark business clouds was the sun and now that the sun has come through, the harvest must follow.

Friend dealer, 1920 is here and he is yours—if you want him.

The Service Men At the Shows

NOTHING has been more important than the step taken by the Service Associations of New York and Newark in scheduling a convention for service men throughout the country for New York during the show week there. It is the first real attempt to get dealers' service men into contact with each other and to develop the spirit of co-operation so necessary to success in this department of the industry.

IT is important, too, to note that it was the dealers' service men, not the factories, which conceived the idea of a show week convention. The convention of the factory service men was held several weeks ago in Detroit and while it was of a big benefit to the industry and to the service ends in particular, it was not nearly as timely nor held in so accessible a place as this venture of the New York and Newark associations. The factory service men, however, also have a meeting during show week.

THIS dealers' service convention marks the first real recognition of the importance of the service end of the industry. Service heretofore has been a thing apart, not to be considered

with national shows. Now, however, the foreseeing dealers and service men of the east have demonstrated their belief that service work must be considered at the same time that new models are shown.

WE may expect in the near future to have service conventions as a regular feature of show weeks in the principal cities of the country. If dealers are to make a success of car sales, they must learn to service their cars and they can do this in no better way than at the shows where factory representatives are on hand to aid them. The N. A. C. C. until recently has been backward in the service end of the industry. It is now up to the dealers to take the matter in their own hands.

THE service convention of the New York and Newark service men is not to be confined to their own members. It is open to all service men attending the New York show. It is highly desirable, therefore, for dealers, who intend to go to New York for the show, to take their service men along to derive the benefits sure to accrue from the exchange of ideas at these meetings.

What the Shows Should Mean

WE are at the beginning of the show and convention season. In one respect it is the most important season of the year for the dealer. During it he gets a proper perspective on the ensuing twelve-month. It is time when he lines up with his fellows for the sales race of the year.

THE shows are educational and inspirational. There is displayed the product under its most favorable aspect upon which the abilities of the dealer will be expended during the year to follow. It is the one opportunity he has thoroughly to acquaint himself with the best features of his own line and to compare with them the best features of competing lines. This is a distinct advantage for experience has shown that it is as important for the dealer to know what his competitor will offer as it is to know what he himself has to offer.

THEN there are the conventions. Conventions are different these days. A good time is not the only aim and object. Conventions now are more important in so far as they are devoted for the most part to the solution of merchandising problems. The motor car industry has reached the point where the real merchant is a more important factor than is the producer. The latter has reached the point where, under normal conditions, he can take care of the demand. Indeed it is a question if he cannot exceed the ready demand. Therefore, the function of the merchandiser has taken on added importance, because of the future selling of motor cars and other automotive equipment will not be merely taking orders, as it so frequently has been in the past, but will be the result of real merchandising effort. At the conventions the dealer will learn how to merchandise.

We Announce—

The most important step towards satisfactory and profitable service ever taken by a motor trade publication—a series on

STANDARD MECHANICAL OPERATIONS IN TRACTOR SERVICE

Showing IN PICTURES each step and each operation of repairing a tractor. Every move to make and every tool to use and just how to hold it, is illustrated by specially posed photographs—over four hundred of them—there is only enough text to make the illustration stick

BY

A Motor Car, Truck and Tractor Dealer noted for his successful service.

AND

A member of the faculty of a technical college, who is a practical show man and an authority on *time-saving in the shop*.

To tractor dealers and prospective tractor dealers, this series will be of utmost value. To automobile and truck dealers it will be almost as valuable because, since 9-10ths of tractor troubles are engine troubles, most of the operations are on the engine—the same operations as are necessary on the engine of a car or truck.

If you could stand over your mechanics and show them each step to take to find what is wrong with any engine or any tractor, and then fix it in the quickest and surest way, it would

BEGINNING
FEBRUARY 5

Speed up your show, increase your profits, make your place *the* service place, make your sales increase in proportion. Your time does not permit it, but MOTOR AGE will do it for you in

STANDARD MECHANICAL OPERATIONS IN TRACTOR SERVICE

Steel Shortage Confronts Makers

Reserve Stocks Are Near Vanishing Point and Replenishments Hard to Make

DETROIT, Dec. 26—The proverbial unturned stone will be rolled over in the automobile plants within the next few days in the vigorous effort to locate every scrap of steel in the yards. It is no exaggeration to say the majority of factories in the Detroit district are face to face with the critical situation, which two months ago was predicted for the beginning of 1920, when the reserve stocks would have been exhausted.

The reserve stocks are exhausted, or nearly so. No attempt is made to deny that fact. The new year rapidly is approaching and the portentous outlook is proving a nerve-strain that is torturing many of the executives of automobile factories where long-time business relations with steel manufacturers or strong friends at court to push their appeals are lacking.

While it would be hardly fair to assume wilful misstatements of fact with regard to conditions at the various plants, the optimistic statements dealt out by a majority of officials are traceable to overzealousness or unwillingness to acknowledge a lack of foresight that permitted present conditions to arise.

Material Is Lacking

Certain it is that many of the manufacturers actually are operating with the constant fear that the next day may bring conditions that will interrupt production schedules if not actually compelling a shutdown for lack of material. The purchasing agent of one of the largest automobile factories in Detroit, in a statement to Automotive Industries, declared it was a hand-to-mouth existence with many manufacturers, with the odds greatly in favor of their being forced to suspend operations temporarily.

"The man without protection of an order placed at least six months ago may be able to scratch through, but it will be a mighty close shave," said J. H. Main, purchasing agent of the Cadillac Motor Car Co. "The situation today, with all reserve stocks depleted, is infinitely worse than at any time since the strike began in September. As far as our own plant is concerned we still are in fairly good shape and long ago protected ourselves with advance orders."

C. F. Ritchie, purchasing agent of the Detroit Pressed Steel Co., said there was a serious shortage in the steel market and that it would continue critical throughout the first quarter of 1920 at least. While the mills are working with the full labor complement, he said there was lacking the productive effort to insure 100 per cent output.

Announcement of the United States Steel Corporation prices for 1920 are awaited eagerly by industry generally. Whisperings among the independents, who await the corporation's announcement before adjusting prices, fix the in-

crease at from 35 to 40 cents. Some automobile manufacturers predict a much higher raise. Ritchie, whose views on steel are looked upon as most nearly authoritative by Detroit interests, would make no prediction as to the new price, but declared it his belief it would not be under 50 cents.

Ritchie said his company was well protected but admitted that conditions in many local plants were grave and expressed inability to mark out a course that might be pursued to enable them to weather the rough journey during the next few months.

Strike Cuts Output 20 Per Cent

Conservative estimates place the actual loss in the steel output for 1919, as a result of the strike, at 20 per cent. That figure, however, is too low according to a number of automobile manufacturers who responded to letters sent out by F. J. Haynes, purchasing agent for Dodge Brothers. Although his company is well supplied with steel and wields a strong influence with manufacturers, by reason of the enormous consumption of the Dodge Brothers' plant, Haynes wrote to eight manufacturers asking their views with regard to the conditions in the steel industry with relation to the effect on automobile manufacturers.

The reply in every instance, according to Haynes, fixed the actual loss at 25 per cent of the 1919 business.

"That means," said Haynes, "simply that the steel manufacturer goes into the year 1920 with a large per cent of the business for the last quarter of 1919 on his books. Naturally his first effort will be to clean up his back orders and by the time he has completed the task he will find himself approaching the second quarter of 1920 with orders for the first of the new year in a great measure unfilled.

"Straining every energy the steel manufacturers will find it impossible, I believe, to catch up with the procession and put back into our yards the pre-strike reserve stocks for a year at least. In many instances automobile manufacturers had the foresight to fortify themselves against the strike, which to me had appeared inevitable for months before the storm broke. They laid in surplus stocks that have tided them over without interruption and in some cases they have divided with the less fortunate brother who from lack of foresight or some other reason had failed to build up his reserve. Those cases, however, were rare and concerned chiefly the effort of manufacturers to help the parts builders to keep going as a matter of self-preservation."

Some idea of the gravity of the situation is revealed in the efforts of some automobile manufacturers to get steel regardless of the price and it is a well-

known fact that some of them have relied upon the bonus or premium plan to get material. So eagerly have they been to get steel at all hazards they have offered premiums as high as \$20 a ton for sheets, the aggregate in premiums alone, according to an automobile manufacturer, being sufficient to make the annual income of the steel industry of Carnegie's day appear small.

As a rule the larger steel manufacturers are side-stepping this class of business, leaving it to the smaller mills, while they devote their energies to overcoming the production deficit and at the same time caring for established accounts in order that their good customers may continue business without interruption. Even the smaller mills are hesitating to grab at the premium bait, for they, too, are under obligations to old customers, whose demands will keep them busy.

The apparently prevalent and at the same time absurd idea that a resumption of manufacture would find steel mills in position to take care of all demands resulted in the steel manufacturers being literally swamped with orders for finished iron and steel of all kinds which they were not in position to take care of. So anxious have been purchasers that in a number of cases steel consignments varying up to car-load lots have been shipped by express.

Extreme Measures Resorted To

"The fellow who had failed to fill his yard and nurse his stock found himself compelled to resort to such measures in his extremity," Haynes continued. "And he is a long way from being out of the woods now. The coming year is going to be particularly hard for any firm that is not well protected at the source on the basis of long-standing business relations or who is well represented by influential friends in the industry.

"While there is a shortage of all kinds of steel, the sheet situation is felt most keenly. But where the tight rub comes is in the highly-finished sheet steel for body building. With black sheets 100 per cent good and the highly-finished product running to three grades, there naturally will be a tendency with some manufacturers to content themselves with the black production, eliminating the element of chance in the highly-finished product.

"An added feature that must not be overlooked is the fact that the mills are not up to 100 per cent production and will not be for a long time. The individual productive capacity is not aroused as before the war. General business is making a demand for an increased output and that demand would handicap the manufacturer even though mills were operating normally with the productive effort decreased."

Poincare Opens Paris Air Show

Military Features Give Way to Commercial Designs in Post War Exhibit

PARIS, Dec. 21—The importance which is attached to aerial navigation by the French government is reflected by the fact that President Poincare opened the first aircraft exhibition held here since the beginning of the war. Marshals Foch and Petain were also present. The show is being held in the Grand Palais, where upward of 400 exhibitors are staging their product. French manufacturers predominate, but Italy and England also have creditable exhibits. The United States unfortunately is not represented.

The opening of the show was marred by the announcement of the death of Captain John Alcock, the British aviator, who was first to make a transatlantic flight without stop. He was killed while flying a machine from London to Paris, where the machine was to be exhibited.

Show Commercial in Character

The show is purely commercial in character, the military element being slight. An outstanding feature is the large number of big planes for regular passenger and freight service for various European routes. Ten planes are capable of carrying, in addition to the pilot and wireless operator, fifteen passengers, some freight and mails. A machine fitted with two Napier Lion engines will go into regular service next year. Bleriot exhibits a 28-passenger biplane fitted with four Hispano-Suiza engines of 300 h.p. each. This machine has a central fuselage divided into upper tower cabins, the pilot being stationed in the upper forward portion of the fuselage. The four engines are built into the wings, to the left and right of the main fuselage. A fine stream line effect is obtained for the entire machine, which weighs $3\frac{1}{2}$ tons and has shown a speed of 100 m.p.h. It is, however, not yet ready for regular service.

Caudron exhibits an immense biplane having accommodations for 30 passengers. This machine is propelled by three Salmson radial engines, one mounted at the front of the main fuselage and the other two in nacelles to the left and right, midway between the wings. Farman shows the Goliath 12-passenger plane, fitted with two Salmson engines. This machine has a span of 92 ft., a chord of 9 ft. 10 in. and a useful load capacity of two tons.

Italy is represented by a Caproni bombing triplane, fitted with three Fiat engines of 200 hp. each. This, however, is not the latest machine of its type, as Caproni is building a 1000 h.p. plane designed for carrying 100 passengers. Railroad restrictions in Italy made it difficult to get the Italian exhibits to the show in time. Fiat shows a long range, high-speed machine for carrying two passengers and 400 lbs. freight. This machine can remain in the air for 19 hours

and cover a distance of 2500 miles without replenishing supplies.

The passenger planes are well thought out, with a view to providing the best position for the pilot and insuring comfort for the passengers. In every case it is recognized that the passengers must be well protected and that the pilot must be out in the open where he can have an uninterrupted view ahead. In planes having a single fuselage and an engine in front this object is generally attained by placing the pilot immediately behind the engine and completely enclosing the passengers in the fuselage, the latter often being provided with a raised upper structure with windows, forming a light, commodious cabin.

While much attention is being devoted to giant planes, manufacturers are also making an appeal to the individual by the production of small, economical single-seaters. A typical example of the smallest of these is the Demarkay biplane which has a span of only 13 ft. and a length of 12 ft. 6 in., the total weight in flying trim, including a twin-cylinder, horizontal, air-cooled engine, being only 220 lb. This machine sells complete at a price which at the current rate of exchange is about equal to \$1000.

Louis Clement shows a triplane having an 18 ft. span and a three-cylinder, 30 h.p. engine. It weighs 600 lb. empty. Farman is specializing in a sporting type biplane with a 50 h.p. Phone engine. This machine carries two passengers and a useful load of 400 lb. and its price is \$1500 on the basis of the present exchange rate. It is claimed that the operating cost figures out at about 3 cents per mile.

Steel Construction Favored

Steel construction in airplanes is making considerable headway. Breguet and Voisin are the leaders in this direction. These firms are manufacturing all but the wing ribs of steel. Other manufacturers are using metals for the complete machine, including wings, notably a British firm, Bourton and Paul. Potz builds the wings entirely of duralumin.

Engine powers have increased enormously, the most powerful engine at present in production being the Fiat 12-cylinder, 700 h.p. Other engines of higher power are under development and there is talk of single units running as high as 1200 h.p. Automobile type, water cooled engines predominate, but there is as yet no crystallization of design. Freak creations have disappeared, but rotary and radial engines with air-cooled cylinders are prominent, particularly in sizes of 100 h.p. Fiat has produced two new engines, one being a geared down V-twelve with steel cylinders, welded-on jackets and intake manifolds inside the jackets. The valve operating gears in

the center are entirely closed in, and the exhaust, carbureters and magnetos are on the outside of the cylinder blocks. This arrangement of accessories is now insisted upon by the French military authorities in order to diminish fire risks and increase the accessibility. Nothing is carried in the angle of the V.

The other new Fiat is a nine-cylinder, water-cooled radial engine, with cylinders made from steel forgings, having the jacket welded on and the intake pipes, composed of steel tubing, welded inside the jackets, so that there is no visible intake manifold, and the mixture is heated on its way from the carburetor to the valve parts. This engine is fitted with four valves in the head, which are operated by a single push rod and closed by a single laminated spring. With cylinder dimensions of 130 mm. bore and 150 mm. stroke, the output is 320 h.p. and the weight with a supply of cooling water 620 lb.

Peugeot Shows 16-Cylinder Engine

Peugeot has produced a 16-cylinder X type engine of the Joffret system, having a bore of 130 and a stroke of 170 mm. The cylinders are made of steel and there is a common sheet aluminum jacket for each set of four. Four valves are located in each cylinder head and are operated through an overhead camshaft. The feature of this engine is the straight intake manifold for each group of four cylinders, which is water-jacketed. There are two fuel jets in the end of each manifold branch and air also is admitted from the two ends, so that the manifold forms the mixing chamber.

Another Peugeot engine is a twelve-cylinder V with 160 by 170 mm. cylinders. This is an aluminum construction with steel cylinder liners, overhead valves and other features reminding of the Hispano-Suiza, but rockets are inserted between the cams and the valves. The carbureters are mounted on the outside of the engine and manifolds pass through the valve gear housing to the inlet valves on the inside of the V.

De Dietrich has a new 1200 h.p. water-cooled W type engine with steel cylinders and steel welded-on jackets. This engine has the camshaft in the crankcase and operates the valves through push rods. Salmson has continued the radial type water-cooled engine but added another engine on the same general lines with steel cylinders and aluminum fins for air cooling.

Gnome shows a new 60 h.p. cylinder, 84 by 106 mm. rotary engine with several departures from previous practice. The cylinders are not held down by studs and nuts. Both valves are in the head and are operated through a single rocker arm. Gas is delivered to the cylinders through an external intake manifold.

Revised Road Bill Up

Senator Townsend Offers Congress Revised Measure for Federal Control

Commission of Five Would Control National Highway System Maintenance

WASHINGTON, Dec. 27.—A revised bill for the establishment of a National Highway System and the creation of a Federal Highway Commission, has been introduced in the Senate by Senator Townsend. The bill, which closely follows the earlier bills which were introduced by Senator Townsend for the same purpose, would create a Federal Highway Commission of five commissioners appointed by the President with the consent of the Senate, each being appointed with regard to the geological conditions of the United States and under the provision that not more than three commissioners shall be members of the same political party. The Commission will establish, construct and maintain a national system of highways composed of connecting interstate roads which shall be the most practicable routes and constructed with consideration for the location of agricultural and industrial production centers. The system may include the highways connecting water ports and the highways of Mexico and Canada. They will not include highways in a municipality with a population of 5000 or more.

Authority of Commission

The Commission will have authority to make the necessary surveys and maps, either directly or through contract with State highway departments, will have the power to hire labor and purchase supplies and maintain equipment and will work as co-operatively as possible with State highway departments in the selection of highways.

A portion of the national highway system in each State shall be equal to 1 per cent of the total highway mileage in each State where that will suffice to offer at least two highways connecting with the national highways in adjoining states. Where it will not be sufficient the Commission will have the power to increase the mileage of the national system as much as is necessary to provide two such highways. It may select any highway or part of a highway for its national highway system that has been constructed by the State or county municipality. In consideration of the benefits to be derived by each State from the establishment of a national highway system it will be a condition preceding construction of the highways selected for the national system that the existing right of way of a highway will be transferred by the State to the United States Government. Permission is given to railroads or canal companies to convey property to the Government for the pur-

pose of this Act if it has been acquired by grant from the United States.

Provision is made to allow the transfer of public lands or reservations belonging to the United States when they are reasonably necessary for the establishment of a national system.

The use of only such durable types of surface and materials as will adequately meet the future traffic needs is authorized, and the Commission will have the authority and power to determine the types of construction, methods and maintenance. All highways in the national system unless impractical because of physical conditions, excessive cost or legal obstacles shall have a right of way of not less than 66 ft. in width and a wearing surface of an adequate width of not less than 20 ft.

The bill will transfer the powers and duties relating to highways or public roads, now in the hands of the Bureau of Public Roads, Department of Agriculture, together with the various employees and appropriations, to the Federal Highway Commission.

Appropriations authorized by the Act include \$50,000,000 which will become available immediately, \$75,000,000 for the fiscal year beginning July 1, 1920, and \$100,000,000 for each of the three succeeding fiscal years, in all \$425,000,000 will be available until expended. Not more than 5 per cent of the appropriation may be used for administering the provisions of the Act.

The bill is now before the committee for Post Offices and Post Roads for consideration.

NO NEW OVERLAND TRUCK

New York, Dec. 27.—The Willys-Overland Co., Toledo, has denied the rumor, prevalent in trade circles for the past few weeks, that the company is planning to bring out a light truck.

Figure On a City Garage

Philadelphia Contemplates Erection of Structure for Use of Municipal Cars


Lower Costs of Maintaining City Vehicles Believed Possible by Action

PHILADELPHIA, Dec. 27.—The erection of a central municipal garage for Philadelphia is being considered by city councils for Mayor-elect Moore's administration. It is figured that at least \$100,000 a year would be saved through putting a stop to the practice of private use by municipal employees of city-owned cars.

The plan is as follows: All municipal cars would be stored, repaired and otherwise maintained and furnished to the various departments from the common garage only on proper requisition. This would prevent private use of the vehicles, accessories, gasoline and oil. All cars kept in this centrally located garage would be pooled, so that if any department needs a car, it will order one on the requisition and the chauffeur will account for the trip by filling out a printed form, on his return. The cars would be standardized, so that instead of about ten makes of automobiles and trucks, as at present, the types would be reduced to no more than two or three.

A repairshop with the latest equipment would be maintained in the garage, or in connection with it, to keep the machines in first class condition. A standardized parts supply, to be drawn on, as in the case of machines, gasoline and oil, only by requisition also would

How One Company Uses Motor Age

Think Intelligently	House Telegram	Act Quickly
Verbal orders are not satisfactory. All notices, orders and dispositions of instructions must be given in writing to avoid errors, delays and oversights.		
Notice to Dep't	Mr. Doty	Date 12-15-19
		Time Deliv'd
		Time Rec'd
<p>You will be interested in the second editorial on page 16 of the current issue of Motor Age.</p> <p>After you have finished reading it and such other items as you care to, please pass to Mr. Eley, Service Manager, to read pages 8, 22 and 23, then to Mr. Bowen, Parts Manager, for the first editorial on page 16.</p> <p>After each has read the articles mentioned, please check and return.</p> <p style="text-align: right;">Signed </p> <p>IMPORTANT: When the above has been disposed of, write your remarks on back of this sheet and immediately return to the undersigned</p>		

The Overland Hanson Co. of Waterloo, Iowa, uses the above "house telegram" to point out to heads of departments and other employees the valuable features to be found in Motor Age each week.

be necessary. A corps of expert motor mechanics would be required. Bulk supply of tires, parts, oil and gasoline, as well as grease would be kept in the garage.

It is believed that the logical procedure would be to place the institution under the direction of a superintendent appointed by the city's purchasing agent. In some large business concerns, notably the Victor Talking Machine Co., of Camden, N. J., which maintains a very large fleet of trucks, trailers, tractors, automobiles and fire apparatus, the garage is under the direction of the purchasing agent's department.

Some councilmen are in favor of pooling the automobile and the truck garage, but others maintain, on account of the large number of trucks owned by the city a separate garage on a similar plan should be maintained therefor.

The private use of city automobiles recently was called to councils' attention when a bill was presented for nearly \$500 worth of repairs to the car of the assistant director of the Department of Public Health and Charities.

LEACH-BILTWELL BUYS PLANT

The Leach-Biltwell Motor Co., Los Angeles, has purchased the plant of the Republic Truck Co. in Los Angeles. This gives 12 acres of ground, with three large buildings, besides office building, dry kiln, pump house, loading dock, spur tracks, etc. The plant is three miles from Los Angeles with direct Santa Fe railroad connection. The new plant cost \$250,000.

Oregon Boosts "Gas" Costs

State Legislation Forces Hardships on Users of All Motor Vehicles

Companies Forced to Raise Their Prices from 1½ to 2½ Cents Per Gallon

PORTLAND, ORE., Dec. 27—Oregon motorists are now "enjoying" an extra charge of 1½ cents more per gallon for gasoline than their fellow motorists of Washington and California have to pay. It really figures up 2½ cents more per gallon, because of a state tax of 1 cent per gallon levied by the last legislature for the state highway fund.

The Standard Oil and Union Oil companies have just added 1½ cents per gallon to the price of gasoline in Oregon and the Shell Co. and Associated Oil Co. are expected soon to follow suit, because of the Oregon law which requires that gasoline sold in the state must test 56 specific gravity, Baume. So far as known here no other state in the country requires such a test.

The oil companies declare the increase is necessary to cover the additional cost of putting the Oregon gasoline through a special refining process, of shipping it in special tanks, and of storing it in separate storage tanks. They assert that even 1½ cents per gallon doesn't cover these additional costs and that Oregon

motorists may have to face a still further increase in the near future.

Washington, California and other Pacific coast states have dropped the old specific gravity test, which the oil companies declare is meaningless so far as power value is concerned, and base their tests on the United States government specifications, which are based on boiling points. The gasoline sold in California and Oregon is of about 54 specific gravity.

But the increase in price is not the worst of it. As there is no market elsewhere for the special test gasoline required by Oregon, according to the oil companies, they make only enough of this specially refined product to supply the needs of the state. One result is that any delay in shipments causes a gasoline shortage there.

Last fall the shortage became so acute that the only gasoline in Portland was the stock in the service station tanks, and many towns in the interior were entirely without motor fuel. At that time Governor Olcott suspended the law for fifteen days to permit the oil companies to bring in gasoline of lower specific gravity from Washington to tide over the emergency. But the companies declare such a situation may occur at any time in the future, despite the increased price.

Governor Olcott recently called a special session of the legislature for January. The gasoline law is certain to be one of the matters brought before it.

At present motorists in Portland have to pay 25 cents per gallon for gasoline, which includes the 1 cent state tax per gallon. Just across the Columbia river in Vancouver, Wash., only nine miles away, gasoline costs only 22½ cents. The Washington gasoline appears to give just as much satisfaction as the higher priced special process Oregon motor fuel.

Now It's the Motorcycle Limousine



Here is an innovation in limousine side cars which was shown at the recent Olympia show in London. Evidently the mere shortage of cars is not going to prevent Londoners from having their limousines.

CINCINNATI TRUCK MEN ORGANIZE

Cincinnati, O., Dec. 27—The newly formed Cincinnati Truck Dealers' Association, organized in the critical moments of the coal strike, when use of motor trucks was being considered seriously as a means to bring fuel from the non-union mines of eastern Kentucky, has completed its organization by electing the following directors: Charles Rattermann, E. L. Scott, William Kilduff, Harry P. Kelly, L. A. Woodward, A. R. Hoffman and Albert Staab. The finance committee is composed of A. B. Kibby, J. H. Nostheide and Albert Herschede.

PORTER GETS LAFAYETTE FOR NEW YORK

New York, Dec. 27—H. T. Porter, for the last four years sales manager of the Cadillac Motor Co., in New York, has been appointed distributor in the metropolitan district for the Lafayette car. Porter has been succeeded in the Cadillac sales establishment by Arthur Randall, who has managed the Cadillac branch in Brooklyn. W. H. Donaldson, who has been with Randall in Brooklyn, will succeed him as head of the Brooklyn establishment.

Protects Car Names from Unauthorized Advertising

NEW YORK, Jan. 1—Supreme Court Justice Greenbaum has issued an injunction restraining two groups of persons engaged in automobile service work from using conspicuously in advertising and in the New York Telephone Directory, the names of the Cadillac, Dodge, Hudson and Scripps-Booth. The injunction, applied for jointly by the New York companies representing these makes of cars, was obtained through the activity of the New York Automobile Dealers' association, which discovered the listings in the telephone book and various forms of advertising.

The defendants in the case, operating under several names, had telephone listings as follows: Cadillac Auto Maintenance Co., Dodge Auto Service Station, etc., in each case, by use of the word "auto," getting into the telephone alphabetical list ahead of the salesrooms and service stations operated by metropolitan representatives of the cars mentioned. In addition to the listings, the defendants had advertisements in black type in the Telephone Directory and other publications with the names Cadillac, Dodge, etc., prominently displayed and telephone numbers given alongside.

The complainants charged that both the telephone listings and the advertisements were misleading in that automobile owners would be led to believe that they were announcements of the Cadillac, Dodge, etc., companies.

The court held up temporarily distribution of a part of the latest Telephone

Directory, comprising 600,000 copies, but later permitted this to go out when the injunction, as applying to the telephone company, was discontinued. The injunction stands as against the other defendants, prohibiting them from using the words Cadillac, Dodge, etc., as the leading words in display advertisements, letterheads, circulars, etc., and from using the names of the cars mentioned in their telephone listings in the future.

According to the Automobile Dealers' association the practice enjoined has been followed quite extensively in New York and other cities. The Buick, in New York, got ahead of the defendants in the telephone book by listing its service stations under the names of Buick Authorized Service, Inc., a name recently adopted.

PORTLAND TO HOLD TRUCK SHOW

PORTLAND, Ore., Dec. 27—There will be a truck show in Portland this winter, after all. After first deciding against a truck show because of the fact that the Ice Palace, where the Portland passenger car show will be held from Feb. 23 to 28, is not large enough to show both passenger cars and trucks at the same time, the truck men reconsidered their action at a subsequent meeting of the Dealers' Motor Car Association of Oregon and voted to hold a separate truck show on the same dates.

The truck show will be held in the Portland Armory. M. O. Wilkins, president of the Dealers' Motor Car Asso-

ciation of Oregon, will manage both shows. He will be assisted in the truck show by an advisory committee composed of F. H. Nash of the Atterbury Truck Sales Company; Del Wright of the William L. Hughson Company, and A. L. Denney of the Koehring Machine Co., N. W. To eliminate all competition between the two shows, tickets to each will be sold with coupon attached, which will entitle the holder to free admittance to the other show.

SET DATE FOR COLUMBUS SHOW

Columbus, Ohio, Dec. 29—The annual Columbus Automobile Show will be held at Memorial Hall, Feb. 24 to 28. These dates were selected by the show committee of the Columbus Automobile Show Co., which was organized by a large majority of the Buckeye capital dealers. The large Memorial Hall will be appropriately decorated for the occasion and only passenger cars will be displayed on the main floor. Trucks and accessories will be shown in the gallery, lobby and approaches. The committee consists of E. W. Pavey, Ora S. Zimmerman and Ira N. Madden. As in former years, W. W. Freeman has been appointed manager. Mr. Freeman has opened headquarters with the Columbus Buick Co., 288 East Long street.

BATES NOW WITH BOOTY

E. A. Bates, one of the veteran figures in the carburetor world, has severed his connection with Beneke & Kropf, to accept the management of the company manufacturing the new Booty Carburetor. Rumors of this change have been circulating in trade circles for weeks and now the confirmation is made by the Booty Carburetor & Manufacturing Co.

RIVAL SHOWS IN ROCHESTER

Rochester, Dec. 27—In an effort to buck the regular Rochester automobile show a group of Rochester automobile and accessory dealers have organized an association to conduct a show during the week of Jan. 19. The exhibition of the Rochester Auto Trades' Association is scheduled for the week beginning Feb. 2.

When the space for the regular automobile show was auctioned off none was available for several dealers who are not affiliated with the Rochester Auto Trades' Association. These dealers say their business would suffer if they had no opportunity to show their cars. Half of the show space has been sold and paid for and communication has been opened with dealers in Buffalo, Syracuse and New York who wish to exhibit.

The following officers have been elected: John J. Hicks, president; W. N. Brockway, treasurer; Major John H. Kelly, secretary; Augustine B. Hone, chairman of the executive committee; Lloyd W. Culver, show manager; advertising committee, Lloyd W. Culver, Ernest J. Ingraham, T. W. Finch; decoration committee, H. F. Dottle, Robert L. Downle, J. M. Simmons; space committee, Floyd N. Ward, John L. Hicks, Lloyd W. Culver; music committee, D. J. Fitzsimmons, Floyd N. Ward and Major J. H. Kelly.

War Cars May Be Turned Over to Other Departments

WASHINGTON, Dec. 28—Motor vehicles can be turned over by the War Department to other government departments without charge, according to a decision rendered by the Department of Justice.

The effect of this decision will be to allow the transfer of nearly all the surplus vehicles from the War Department to the Post Office Department, Treasury Department, Bureau of Public Roads and other government divisions. The transfer of these vehicles was started immediately following the armistice, based on the Post Office Appropriation Bill of 1918 which authorized their transfer without charge, but which was halted by the passage of the Sundry Civil Bill which contained a clause prohibiting the transfer of War Department equipment without charge and which was interpreted by the Judge Advocate General of the Army as a prohibition of further transfer. The Attorney General's decision as reported here is to the effect that the Judge Advocate General made an erroneous interpretation and that the provision in the Post Office Appropriation Bill is still valid.

The Bureau of Public Roads, Department of Agriculture had already been allotted 20,519 trucks and 7000 other motor vehicles, many of which have already been allotted to the various states in lieu of the cash or appropriations under the Federal Reserve Act.

GEORGIA TURNS DOWN ARMY TRUCKS

Atlanta, Ga., Dec. 27—The public works committee of the Fulton county board of commissioners today notified the State Highway Department that it would not accept any more army trucks and that the six trucks now on hand would be returned to the government. This action was taken following a report which showed that the trucks were in such bad condition that they were not worth the freight it cost to get them here, and the expense of having them inspected by an expert. The report stated that the six trucks now on hand have spent most of their time in the repair shops and have given very little service.

Under an amendment to the federal postal bill unused army material was allotted to the various states without cost save the payment of freight. In the case of trucks the expense must also be borne of having them inspected. Fulton county received its first allotment of trucks through the State Highway Department, and the next allotment is due in January. The county will not pay the freight and inspection costs and has notified the state department to that effect. Furthermore it is desired to return the trucks now on hand, as they are in such bad condition that their upkeep costs considerably more than the trucks are worth, in view of the actual service they give.

SHOW ASSURED FOR MASON CITY

Mason City, Iowa, Dec. 26—A year ago when those interested in the automobile industry began to survey the outlook for the ensuing year it was predicted by many, who were in a position to know, that there would not be enough automobiles manufactured to anywhere near supply the overwhelming demand which would come with the first warm days of spring.

The public was more or less skeptical in its receipt of this statement. Today everyone knows that the prediction was very mild in comparison with the facts and it seems that more credit will be given to the predictions for the coming year which are to the effect that there will be an automobile shortage of two and one-half million cars.

Owing to these conditions many cities which have formerly held automobile shows annually have decided to have no show this year; but Mason City, in keeping with its good reputation along other lines, is to have a show.

The Mason City shows have been

Plan for Uniform System of Highway Construction

NEW ORLEANS, La., Dec. 28—Preparatory to presenting the whole problem of road building in the state to the legislature at its next session, the Motor League of Louisiana is collecting detailed statistical data on the road-building, road bond issues, and general road work done in all the parishes of the state in the last five years. Information already obtained shows that, from the millions spent in this work, a large percentage has been absolutely wasted through the method of constructing roads by parishes, instead of as a state system. In many parishes, all the money expended on certain roads has been virtually wasted, inasmuch as these highways, after from three to five years' use, are now worthless, and all but impassable.

The present system of road building in Louisiana is carried on by the police juries, corresponding to the county supervisors of northern states, who vote bond issues and decide which roads are to be built or improved. The people of the parish then vote to approve or

Service Men Plan Meets During New York Shows

NEW YORK, Dec. 27—One of the attractions of show week will be the convention and banquet of the combined Automotive Service Associations of New York and Newark, which is to be held at 2 p. m., Jan. 5, at the Automobile Club of America.

Al Reeves, General Manager of the National Automobile Chamber of Commerce, will open the convention. Important papers on service topics will be presented by men well known to the in-

known as among the best in the state, and it is the intention of the association to make this year's show live up to the standard of those held in the past.

A meeting of the Mason City Auto Show association was held yesterday noon at the Cerro Gordo hotel. At this meeting officers were elected for the ensuing year and plans gotten underway to give Mason City one of the best automobile shows it has ever had.

Owing to the fact that a good many things must be considered no definite dates have as yet been decided upon, but announcements thereof will be made soon.

The following officers were elected at yesterday's meeting:

President—Geo. O. Jamesson, of the Chaffin-Jamesson Motor Co.

Vice-President—L. S. Pickford, of the Leaman-Pickford Auto Co.

Secretary—Walter J. Looker, of the Looker Auto Co.

Treasurer—Ralph Barclay, of the Mason City Auto Co.

dustry. Major Osmun, of the Motor Transport Corps, will tell how the automotive industry can co-operate with the army to have transport facilities in perfect readiness for any emergency, and Prof. Favary, head of the automotive laboratories at Cooper Union, will tell of the benefits to be derived from technical knowledge. Dr. Walter Hervey, of the Board of Examiners of the New York Public Schools, will speak on education and there will be papers by members of the two associations. The chairman will be Ralph C. Rognon, President of the New York association.

SET DATE FOR OKLAHOMA CITY SHOW

Oklahoma City, Okla., Dec. 26—The fourth annual Automotive Show will be held about March 15 in the new \$200,000 Coliseum building to be erected on a "Fifty-Fifty" basis by local business men and the packing companies—Wilson & Co., and Morris & Co.—it is announced by George W. Woods, secretary Oklahoma City Motor Car Dealers' association.

Plans for the construction of the Coliseum were successfully negotiated recently between the packing interests and the local Chamber of Commerce, after the automobile and tractor men pledged themselves to take \$20,000 worth of stock in the project.

The \$20,000 subscription, by the way, was obtained in ten minutes, following a 'Possum and Sweet Potato Dinner' staged by the Oklahoma City Motor Car Dealers' association. Twenty-five 'Possums' were carved for the occasion and old-timers assert this was the biggest 'Possum dinner ever held in the South. It was prepared in barbecue style by an "old-fashioned" Alabama nigger, according to Secretary Woods.

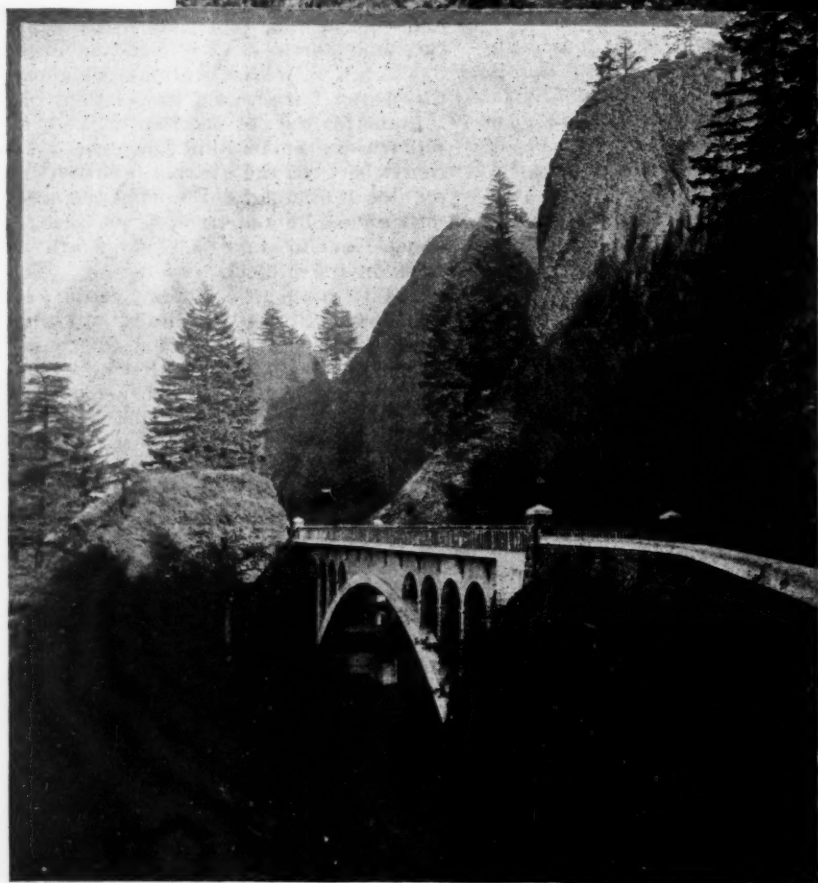
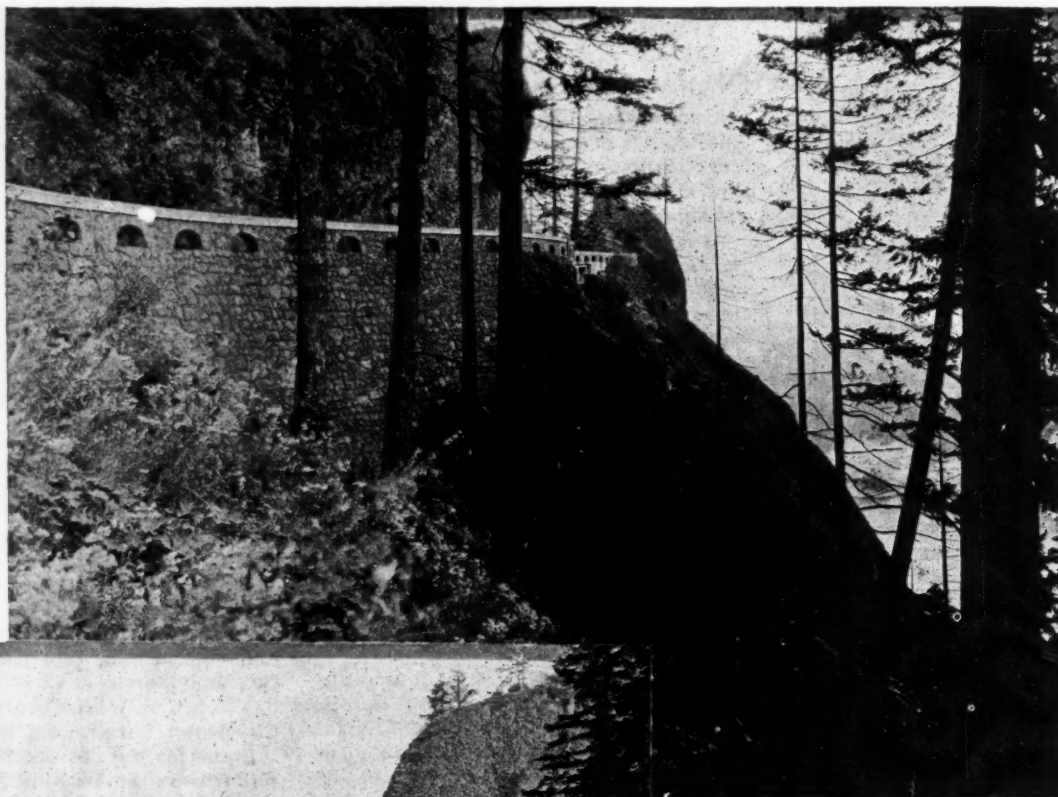
Exact dates for the Automotive Show will not be decided until about the first week in February, according to Mr. Woods, since the progress of construction will largely determine the time of the show.

Plans for the building call for 60,000 square feet of floor space, which is about 10,000 more square feet than was available last year, when the dealers constructed a temporary building for the show.

JEFFERS FIRESTONE MANAGER

Detroit, Dec. 28—R. H. Jeffers, manager of the Detroit branch of the Firestone Tire & Rubber Co., has been named general manager of the new Firestone factory at Hamilton, Ont., where operation is promised within five months. Announcement of the plan to establish a plant at Hamilton was made some time ago. The Canadian company will have a capital of \$5,000,000 and the new plant will have an output of 3500 tires a day, 2000 persons being employed in their manufacture.

Some Scenes Along the Columbia River Highway



The new Columbia River Highway in Washington rightfully claims the honor of being one of America's beauties. It is a masterpiece of engineering skill with its roads cut through mountain sides that tower majestically above the motorist. The above photographs are typical of scenes along the thoroughfare

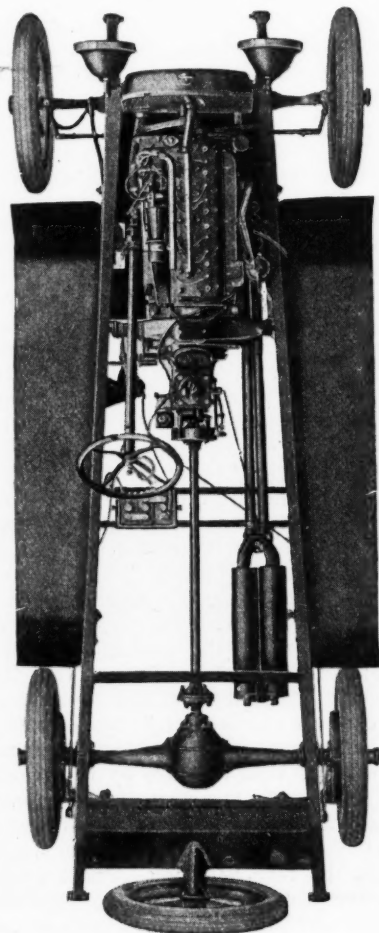
New Lexington Greatly Simplified

Unit Type Frame Adopted—Eliminates Some 100 Parts From Chassis

BY the adoption of a unit type frame, that is, a frame with the running board riveted to it integrally and with the body mounted directly on the frame, the new Lexington series of the Minute-Man Six model, reduces its construction by about 100 parts. The Moore multiple exhaust is retained in the new series. The chassis has a wheel base of 122 in. It is powered with a Continental 7-R engine, having the cylinders cast in block with a removable head. The bore and stroke is $3\frac{1}{4}$ by $4\frac{1}{2}$ in., which gives a piston displacement of 224 cubic in. and a N. A. C. C. rated hp. of 25.35 hp. The engine though, develops much more than its rated hp.; at 2400 r.p.m. it develops 46.3 hp. The engine has a four bearing crankshaft that is hollow which serves for the distribution of oil from the gear driven oil pump.

Integral with the engine is the clutch and transmission. The clutch is of the dry disk type made by the Borg and Beck Co., and the gearset, a conventional three speed forward and reverse unit is of Warner make. The power is trans-

Airplane view of Lexington chassis, showing unit frame construction and multiple exhaust system



SPECIFICATIONS OF LEXINGTON

Wheel base, 122 in.

Engine, Continental, Model 7-R; bore and stroke, $3\frac{1}{4}$ by $4\frac{1}{2}$ in.

Clutch and transmission in unit with engine.

Floating rear axle.

Rayfield carburetor.

Gray & Davis electric starting and lighting.

Price, five-passenger model, \$1885.

mitted through the Hardy universal joints to the Hess rear axle where the drive is through spiral bevel gears. The rear axle is of the floating type and all driving and braking strains are taken through the springs. This is the conventional type of Hotchkiss drive.

A Z section forms the frame members. The maximum depth of the frame is $7\frac{3}{4}$ in. and the top side rail, which is 2 in. wide, is bent inward, while the bottom rail of the same width bends outward. Hot riveted to this bottom rail is the running board. This construction produces a tapered frame allowing a narrow front and permitting a very short turning radius.

The starting and lighting end of the electric system is of the Gray & Davis make. Battery ignition of the automatic type is furnished by the Connecticut ignition system; in this system an automatic kick-off is provided that prevents the battery becoming discharged if the

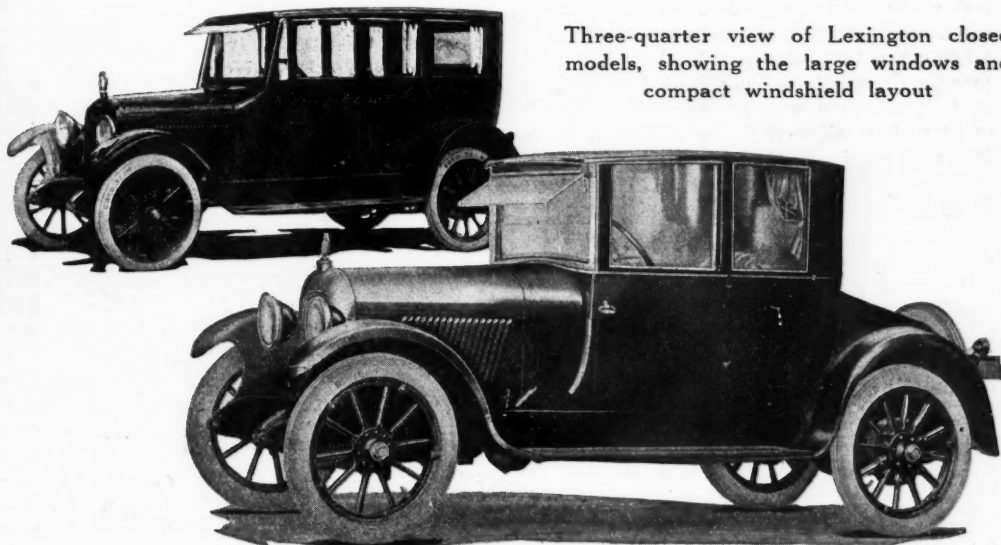
ignition switch is accidentally left on. Regulation of the generator output is by means of a third brush so that to increase or decrease the charging rate the third brush is moved toward or away from the nearest main brush.

A few features worthy of mention on this new series of Lexington cars are the tire pump and speedometer, which are both driven by gears contained in the transmission case. The service brake is mounted on the rear axle; it is of the contracting type, the band contracting on a 16-in. drum. Cable control of the brake is employed; this system tends towards the reduction of brake rod rattles. The emergency brake, which is of the external contracting type, is located at the rear of the transmission case; its action is on an 8-in. drum mounted on the propeller shaft. Equalization is taken care of through the action of the differential.

NEW CAR FIRM ORGANIZED

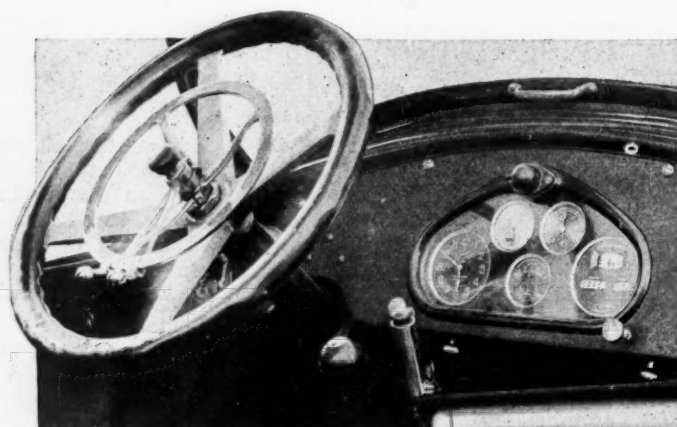
New Castle, Pa., Dec. 29—Formation of the Bacon Motors Corp., of New Castle, for the building of a light six, moderately priced car, is announced by Frederick C. Van Derhoof, president. Van Derhoof resigned as general manager of the automobile department of the Standard Steel Car Co., Pittsburgh, to accept the presidency of the new corporation.

The car will be produced early in the spring at the newly acquired factory in New Castle. Capacity of the present building will be about 50 cars a day. This will be increased with the erection of a three-story factory for a body building, upholstery and painting department, which is soon to be started. Other buildings will be added from time to time on the tract which comprises 21 acres.

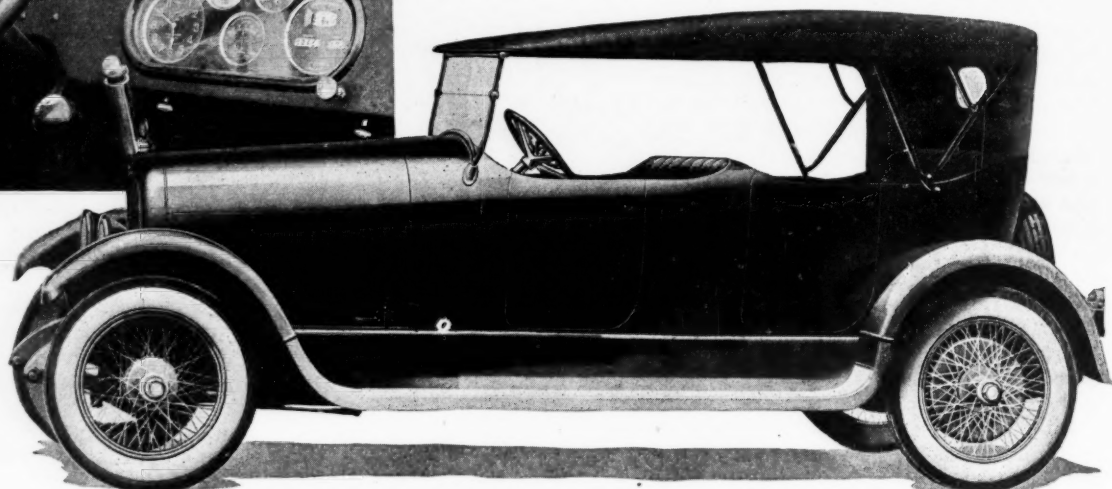


Three-quarter view of Lexington closed models, showing the large windows and compact windshield layout

New Marmon 34 Has Cast Iron Cylinders



Upper illustration shows neat method of inclosing instruments in glass covered compartment. Right, the new Marmon 34, which has 3 in. more room in body



Refinements Characterize Latest Product of Nordyke & Marmon, Although Basically Car Is the Same

CAST iron cylinders in place of aluminum, a two-piece aluminum and iron piston and a 2 $\frac{3}{4}$ -inch crankshaft are among the greatest outstanding features of the Marmon 34 for 1920. Basically, the car remains the same as last year's model, but there are numerous refinements. The new engine construction shortens the hood 3 inches, which is made use of in lengthening the driving compartment and tonneau 1 and 2 inches, respectively.

Another feature of the new Marmon is the adoption of the Delco two-unit system for starting, lighting and ignition, eliminating the magneto.

Marmon Prices

Prices on the Marmon for 1920 are as follows: Seven-passenger, four-passenger and roadster, \$4,650; coupe, \$5,800; sedan, \$6,250; limousine, \$6,450, and town car, \$6,450. Demountable wire wheels are furnished as standard equipment, with wood wheels optional at extra cost. One extra wire wheel without tire is furnished. The tire size on the touring and roadster models is 32 by 4 $\frac{1}{2}$ inches, while on the closed models it is 33 by 5.

Modifications in the Marmon 34 have up to the present been of a minor nature, but the experience gained during the manufacture of the Liberty engine has had considerable effect in shaping the changes in construction for 1920. Three of the important engine castings, including the crankcase assembly, the cylinder head cover and the timing gear cover plate, water pump body and flywheel housing are of aluminum.

Briefly described, the engine is a six-cylinder, vertical type, with 3 $\frac{3}{4}$ by 5 $\frac{1}{2}$

inch cylinder dimensions. The piston displacement is 339.63 cubic inches, and the S. A. E. horsepower rating is 33.75. The new cylinder castings, which have taken the place of the aluminum type with iron sleeves, are in blocks of three integral with a common water jacket. This construction eliminates the joints between the water jacket and the cylinder valve, and has resulted in the use of a three-bearing crankshaft, thus saving the 3 inches in length previously mentioned. One of the weight-saving features of this casting is the short water jacket, the bottom edge of which takes the place of the hold-down flange found on cylinders of conventional design.

The cylinders are fastened to the crankcase in the same manner as the cylinder head is attached to the con-

ventional cylinder block, the studs being fastened into the crankcase and extend up through the block to the cylinder head; thus, when the cylinder head is fastened in place, the whole engine is tied together on these long studs. Removal of the cylinder head permits removal also of the cylinder block, as they lift off the same stud. The nuts holding the cylinder head and cylinder in place are on top of the engine.

New Bearing Design

The bearings are backed by cast-iron, which has been chosen because it has the same coefficient of expansion as the crankshaft and hence, does not tend to expand or contract at a different rate, which Marmon engineers claim is a characteristic of bronze and aluminum. Each of the main bearing bushings is provided with a facing of anti-friction metal $\frac{1}{8}$ -inch thick. On the center bearing, this facing extends over the ends of the bushing and carries the end thrust to the crankshaft. The anti-friction metal is die-cast into the cast-iron bushing. The advantage claimed for this method of construction is the added stiffness of the iron bushing, which helps it hold its shape more closely and the more effective contact with the upper half of the crankcase, and the bearing cap which holds it in place. It is claimed that the conduction of heat from the bushing to the case is better and consequently greater life will be obtainable. The main bearings are held in place by removable caps which are attached to the upper half of the crankcase by $\frac{1}{2}$ -inch studs, two in the front and center bearings, and four in the rear bearings. The bearing caps are aluminum with two ribs for stiffness and cooling. The bushings are

SPECIFICATIONS OF MARMON

WHEELBASE136 in.

ENGINE, six-cylinder 3 $\frac{3}{4}$ by 5 $\frac{1}{2}$ in.

LUBRICATION High pressure system

STARTING, LIGHTING AND IGNITIONDelco

CLUTCHMultiple disk

TRANSMISSIONAmidships

REAR AXLE..Three-quarter floating

TIRES32 by 4 $\frac{1}{2}$

PRICE, seven-passenger, four-passenger and roadster\$4650

prevented from rotating by means of dowel pins in the crankcase.

To guard against errors in balance, due to varying connecting rod weights, a strict interchangeability is maintained on the rods. The rod is machined all over, not only for the purpose of being able to hold it to close limits, but also to obtain a minimum weight. The rough forgings for the connecting rods weigh 8¾ pounds. The finished rod, including the four connecting rod bolts and nuts, weigh 3 pounds and 14 ounces. The inside of the connecting rod big end is turned to insure a perfect seat for the crank pin bushing, and the bushing is die-cast directly in the end of the connecting rod. This is claimed to provide a more perfect contact of the bushing and rod and for this reason, to conduct the heat away from the bearing more rapidly.

Camshaft Lighter

In order to maintain the rigidity of the valve drive, a 1¾-inch camshaft is employed. Two flanges are formed at the center of the shaft on either side of the middle bearing to take the end thrust on the shaft, and at the rear end the shaft is extended beyond the cams to form the rear bearing. The front end of the camshaft is enlarged to form a 3½-inch diameter flange, in which the camshaft and timing gear is attached. For weight reduction, the front end of the camshaft is drilled out. This reduces the weight of the shaft by 4 pounds.

All of the valves are carried in the detachable cast-iron cylinder head. The valves are directly over the center line of the crankshaft so that it is possible to use interchangeable valves, rocker arms, push rods and valve tappets. Although the cylinder blocks are cast in groups of three, the head is a single casting, which serves to tie the cylinder blocks together, and also eliminates any water connections or manifolds between



Details like the compartment for thermos bottles, etc., shown here help to make the new Marmon an ideal car for tourists

the two blocks. There are four intake and four exhaust ports in the right side of the cylinder head, to which the intake and exhaust manifolds are bolted. Carrying the two manifolds on the same side of the engine permits the use of a preheating system without complicating manifolds and extra hot-air pipes. The spark plugs are located in the top of the cylinder instead of the head, so that it is not necessary to disconnect the ignition wires when removing the head. On the top of the cylinder head are mounted the rocker arm supporting studs. These do not have to be disturbed when removing the head from the cylinder. To take care of the high speed characteristics of the engine, a particularly light-weight valve operating mechanism is utilized.

The intake and exhaust valves are interchangeable, being both of large size, 2 inches in diameter, or more than half the cylinder bore. The valve stems are ¾-inch diameter and just over 5 inches in length. The intake and exhaust valves both have a lift of ¾ inch. Both valves are equipped with dual springs.

The valve mechanism is entirely enclosed. There is an extra wall on the

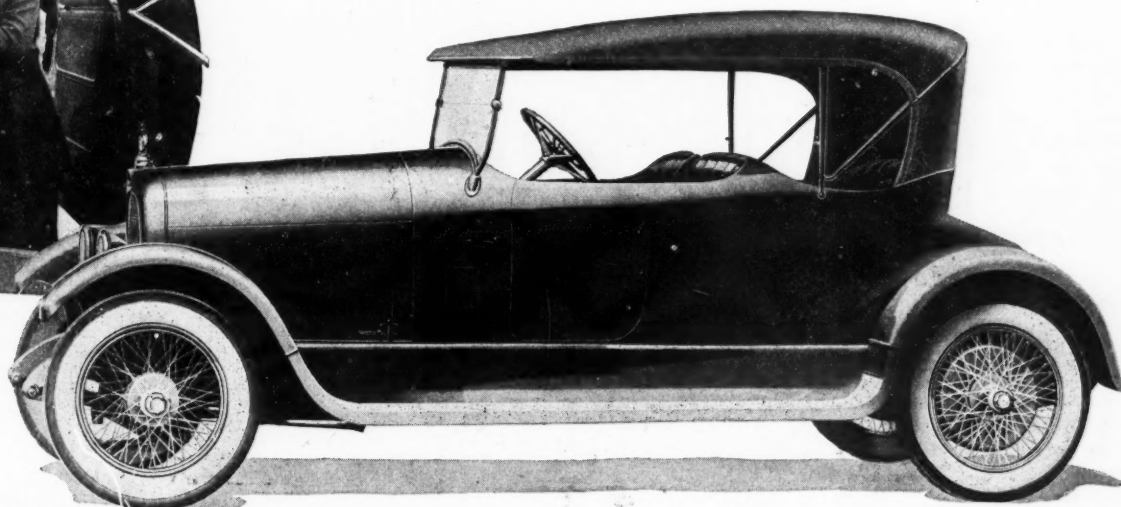
camshaft side of the crankcase, cylinder head, which encloses the valve push rods. The overhead mechanism is enclosed within an aluminum cover and the breather of the engine on top of this cover so that all vapor or spray oil is introduced into the engine. The valve mechanism is so arranged that adjustment for clearance can be made while the engine is running.

In machining the cylinder head, the combustion chamber is completely formed. The portion of the combustion chamber above the cylinder bore has a spherical-shaped counterbore to give clearance for the valves and assist in distribution. Completely machining the combustion chamber results in equalizing the compression pressure.

One of the most interesting features of the new Marmon design is the piston. The requirements are light weight, good compression and non-smoking. The piston designed by Marmon includes all of these requirements and is of aluminum and iron, a composite type. The use of aluminum for the upper or hottest portion insures good conduction of heat from the head, and the use of iron for



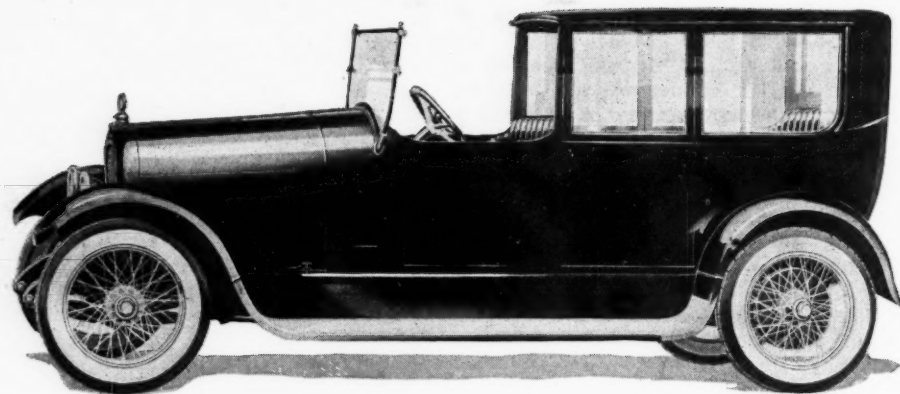
Above, neat compartment for gloves, goggles, etc., within easy reach of car occupants. Right, the four-passenger Marmon roadster



the skirt is designed to accomplish the sealing. The aluminum casting carries the piston rings and piston pin bearings, as well as the four 5/16-inch studs, which hold the two portions of the piston assembly together. The studs are screwed into the aluminum part of the piston and prevented from turning after they have been inserted by small brass rivets that pass through the casting wall in the stud. The top of the aluminum casting is provided with 3/16-inch piston ring grooves, equally spaced. The piston pin bosses are located near the bottom portion of the casting and are reamed holes, 13/16 inches in diameter, with a bearing surface 1 3/4 inches long. The bottom of the aluminum portion is finished off to provide a bearing seat for the cast-iron skirt which is attached to it.

Automatic Pressure Lubrication

The skirt portion is a plain, cast-iron cylinder, with a flange on the inside to bolt up against the bottom of the aluminum portion. Its only connection with the aluminum portion is at this bottom flange, so that the difference in the expansion rates does not have any effect on the efficiency of the piston. Between the top of the skirt and the bottom of the piston ring section of the aluminum portion of the piston there is a circumferential opening into which the oil from the cylinder walls is scraped during the down stroke. The oil scraped off in this manner is caught in the 1/16-inch annular space between the parts of the piston assembly and fed into the piston pin bushings in the aluminum casting by oil



Marmon town car, which the concern claims has been built and appointed to meet demand of the most particular buyer

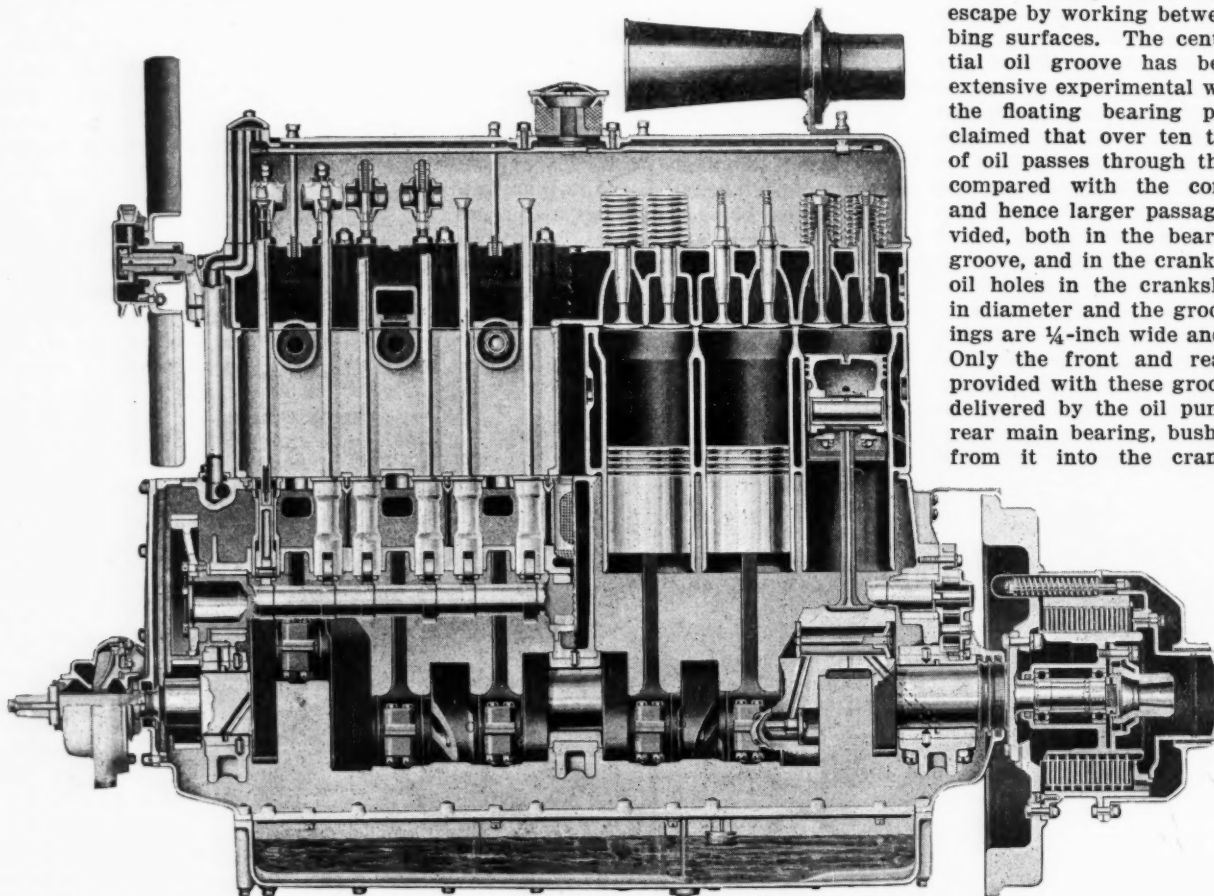
ducts, and to the bronze bushing in the upper end of the connecting rod by an oil hole in the hollow piston pin. The total overall length of the completely assembled piston is 4 11/16 inches. Of this length, 3 1/2 inches are taken up by the cast-iron piston skirt.

Lubrication of the engine is by an automatic, full-pressure system. The maximum oil pressure is attained when the engine is working hardest, or when the pressure or vacuum in the intake manifold is lowest. This is in accordance with Marmon practice for a number of years. This year, however, the regulator is no longer placed between the crankshaft and the oil pump, but is at the front end of the oil system, or at the opposite end from the pump, with the crankshaft between. All the oil delivered by the pump at any speed is

delivered to the hollow crankshaft. This tends to cool the shaft and provides an excess of oil, the bearings being provided with lubricating oil in proportion to the size of the outlet openings in the by-pass valve. As the by-pass valve is closed, the pressure on the oil in the center of the crankshaft is increased and hence, more oil is forced out through the bearings. In this respect, lubrication of the rubbing surfaces is exactly the same as in previous Marmon cars, but with an additional advantage of having a cooling effect on the crankshaft and main bearing.

Crankshaft Well Oiled

The main and crank pin bearings are claimed to practically float in oil, because they are shimless and grooveless, hence the full oil pressure is applied to these bearings and the oil can only escape by working between the two rubbing surfaces. The center circumferential oil groove has been made after extensive experimental work to carry out the floating bearing principle. It is claimed that over ten times the supply of oil passes through the crankshaft as compared with the conventional type, and hence larger passages must be provided, both in the bearing, bushing oil groove, and in the crankshaft itself. The oil holes in the crankshaft are 3/8-inch in diameter and the grooves in the bearings are 1/4-inch wide and 5/16-inch deep. Only the front and rear bearings are provided with these grooves. All the oil delivered by the oil pump is fed to the rear main bearing, bushing grooves and from it into the crankshaft. Conse-



Sectional view of Marmon engine, showing the entire layout of units, as well as new multiple disk clutch

quently, it has to be large enough to take this volume of oil.

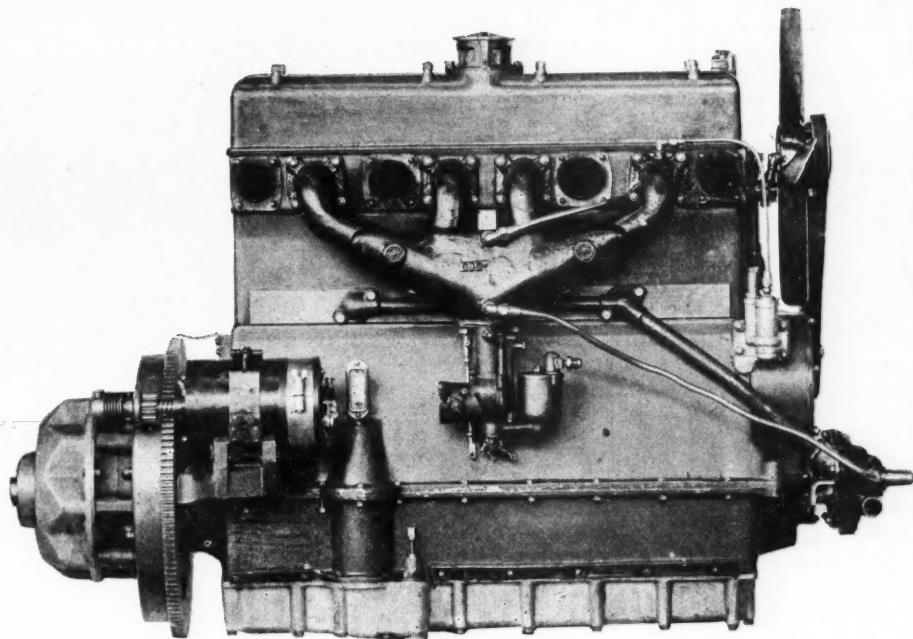
The timing gears are oiled by a stream which is directed to impinge on the point of contact between the crankshaft and camshaft gears. The generator drive gear, which forms the third gear of the system, does not depend upon the oil supplied in the manner for its lubrication, this being taken care of by a separate feed line. The oil pump is a gear type located at the rear end of the engine just back of the camshaft. It is driven by an Oldham coupling from the rear end of the shaft. The oil regulator is located on the forward, right corner of the crankcase, and all the oil passages through the regular are cast integral with the case.

A new clutch has been fitted to give smoother and easier operation. It is a disk type with ten driving disks and nine driven disks. They are saw steel, Raybestos faced. The former cone clutch had a surface of 111.9 square inches. The present multiple disk type has more than three times this area.

Gravity Feed Carburetor

The transmission gear set is placed amidship on the forward end of the torque tube, just back of the cross-member in the center of the car. It is not fastened rigidly to the frame, but is freely held in suspension by a ball and socket joint which takes up the driving and braking thrust, as well as the torque.

The rear axle is a three-quarter floating type. The driving axle carries a taper which is drawn into the wheel hub. The rear axle housing is divided into three sections, two drawn steel end supports and a cast aluminum distance piece in the center. The central piece acts as the differential housing. The brake drums are pressed steel. The drive is through helical bevel gears. The torque tube is tapered from the rear to the forward end. The deep frame chassis which has distinguished Marmon for the past three years is continued. The



Right side of Marmon engine, showing the water-jacketed intake manifold and starting motor mounting

gasoline tank is carried in the cowl, giving a gravity feed to the carburetor. It is above and to the rear of the engine, the pipes from the tank to the carburetor being but 39 inches long. The tank has an 18-gallon capacity and has a magneto gauge on the cowl to indicate the amount of gasoline in the tank. The speedometer drive is through a flexible shaft from the pair of spiral gears running in oil, mounted on the main drive shaft to the rear of the gearset up to the front seat.

ROLLS-ROYCE BUYS BIG MASS. PLANT

Springfield, Mass., Dec. 28—Following the purchase of the big plant of the Wire Wheel Corp. of America at East Springfield by the Rolls-Royce Co. of America, Ltd., it is expected that production will start on these cars within

a few weeks. American capital is interested in the new company.

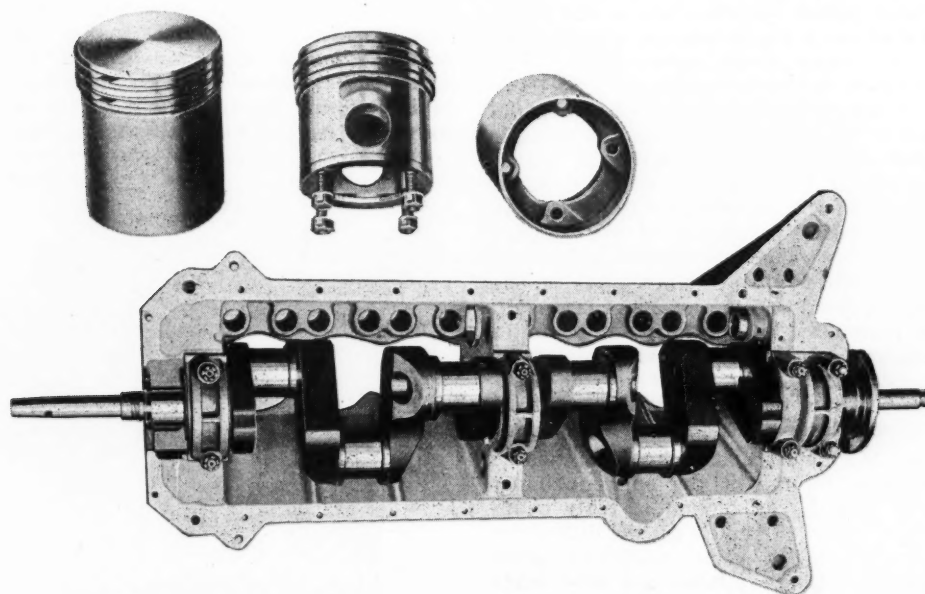
The company officials clipped into Springfield quietly and made the purchase, but the price was not given, though it runs high up into the thousands. Most of the machinery to be used in the production of these cars is either here or now on the way to America, they said, some of it being in storage at Cleveland, from which it can be shipped quickly when needed.

As fast as the government clears the floors of the goods it has in storage there the motor machinery will be installed. The Government officials will remove their goods from the main building immediately, and from the other buildings soon after.

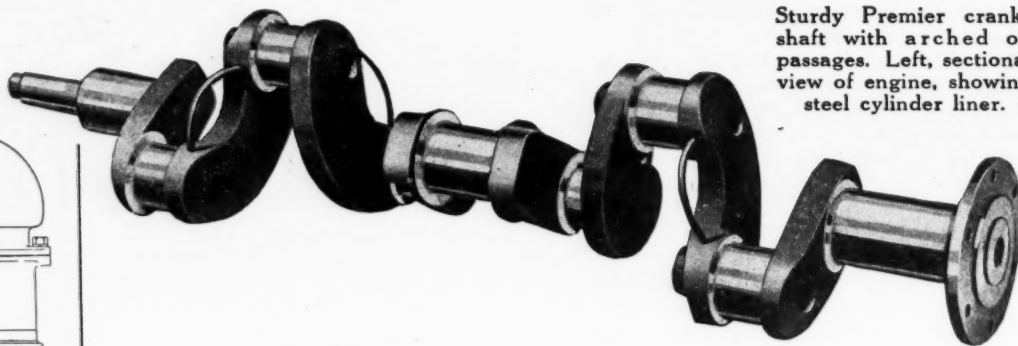
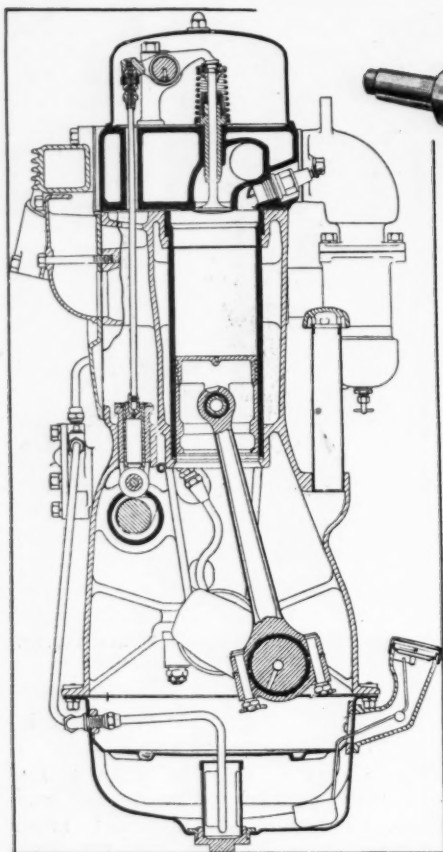
It is expected that from 300 to 400 men will be put to work shortly, and this number will be increased to 1000 plus the clerical force in the near future. The wire wheel plant occupies a 10½-acre plot on the Athol branch of the Boston & Albany railroad. There are seven factory buildings of one-story brick, steel, concrete and glass construction comprising 160,000 sq. ft. of floor space, and is one of the most modern plants in the country. In addition to exceptional railroad facilities there is a spur track to the plant, and a big coal pocket. It was built some years ago by the Hendee Manufacturing Company to produce motorcycles and motor cars, and later on was sold to the Wire Wheel Corporation.

ISSUE BATTERY TRADE DIRECTORY

St. Louis, Dec. 29—A directory of the battery trades of St. Louis has been issued by the Battery Trade Association. The directory, a card 12 by 20 in., gives the name and address of each dealer and the battery he handles. Fifty-six dealers are listed, of which 26 are members of the association.



Marmon combination aluminum and iron piston assembled and disassembled. The skirt is iron. Other view shows the three-bearing crankshaft and rigid crankshaft layout



Sturdy Premier crankshaft with arched oil passages. Left, sectional view of engine, showing steel cylinder liner.

Premier Car of Refinement

Aluminum Engine and Electric Gearshift Retained

SPECIFICATIONS OF PREMIER

WHEELBASE126¾ in.

ENGINE, six-cylinder3¾ by 5½

CLUTCHBorg & Beck

FRONT AND REAR AXLE.....
..... Stanpar

PISTONSAluminum alloy

COOLING WATER CONTROL.....
..... Syphon-thermostatic

MODELS
.....Four and seven-passenger,
two-passenger speedster, four
and seven-passenger closed cars

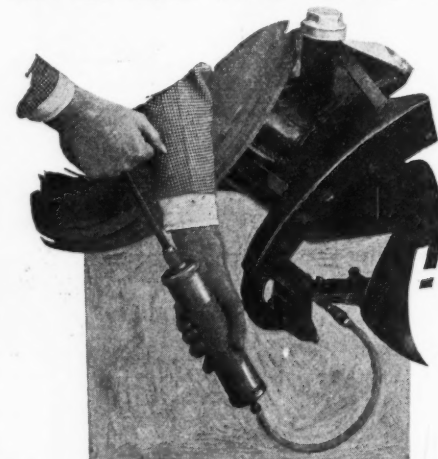
because of the then necessary allowance for the irregularities in cylinder dimensions, primarily in wall thickness.

Pistons are 4 in. long and have three piston rings at the top. There is a counterbore beneath the lower ring to allow the lower edge of that ring to act as an oil scraper.

Syphon thermostatic control of the water placed on the front end of the cylinder head keeps the temperature of the cylinder block at approximately 180 deg. This by-passes the water back to the pump until the proper temperature has been reached and then permits circulation through the radiator. This system makes it possible to bring the engine temperature up to normal within a few minutes after the engine starts.

Fan Mounting Distinctive

Another distinctive feature is the fan mounting on an extension of the water pump shaft. The water pump is attached to the front end of the cylinder block and is clamped in place by a single cap screw. This support also forms the water outlet from the pump and the inlet to the water distributing tube in the cylinder block. This dispenses with a connection and also provides an adjustment for the fan belt tension. A Graton & Knight steel and leather "V" belt is used. Should the water in the engine become frozen, it is possible to start the engine without twisting the



How Premier chassis members are lubricated by Alemite system

COMPLETE equipment is a term that is taken seriously by the Premier Company. The new Premier seems to be furnished with about all the conveniences any owner should want, from double spotlights to a windshield cleaner. This model, styled Model D, seems to be an example of a desire to secure quality, with cost consideration occupying a very subdued position. The Premier Motor Corp. is still an exponent of the aluminum motor and the Cutler-Hammer Magnetic Gear Shift, but both these units, as well as the rest of the chassis, show that the war period of non-production in motor cars was used to realize certain engineering and production ideals.

There is but one standard Premier chassis of 126¾ in. wheelbase, on which are mounted five types of bodies—four and seven-passenger open car, two-passenger speedster, and four and seven-passenger closed. A peculiar curved form to the upper lines of the bodies, referred to as a "Grecian line" and covered by Premier patents, gives unusually distinctive appearance. A gear selecting finger lever on the steering wheel quadrant, supercedes the push button control of the magnetic shift formerly mounted just below the wheel.

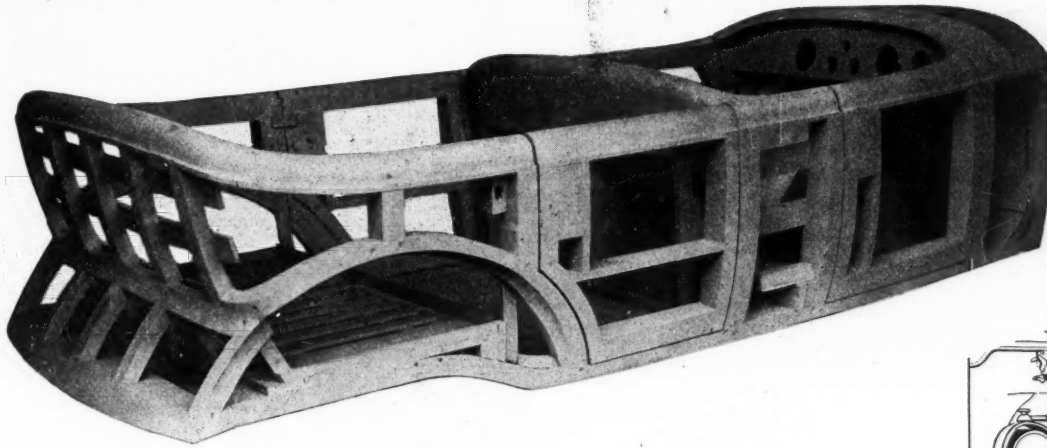
Aluminum Feature Retained

The Premier feature of aluminum engine is retained. The bore and stroke are 3¾ by 5½, giving a piston displacement of 295.22 in., N. A. C. C. rating 27.3 h.p. This engine develops more power continuously than its predecessor because of the improvements in cylinder construction, resulting in ideal cooling and closer fitting pistons. Instead of casting aluminum cylinder barrels, into

which castiron liners are fitted, the present method is to insert the liners in the aluminum case with supports top and bottom, but with free circulation of water around the entire cylinder.

Cylinders have a shoulder at the top which sets against a lip in the aluminum water jacket. At the bottom the cylinder barrel butts up against a similar lip in the lower water jacket flange. The top joint is doubly secure because there is a copper asbestos gasket between the top of the water jacket and the cylinder head. However, a thin vellumoid gasket is placed between the upper cylinder joint and the aluminum water jacket to preclude the possibility of any seepage of water through the copper gasket. At the bottom two gaskets are provided, one of vellumoid and one of cork. The cork is placed on top, or at point of water contact. Vellumoid gaskets are largely responsible for the success of the packing. When wet, they expand to from two or three times their dry thickness.

It is claimed that the combination of uniform cooling of the entire cylinder wall and the production of truly cylindrical bores eliminates all the difficulties encountered in using aluminum alloy pistons. These pistons are now made with only 0.004 to 0.005 in. clearance on the skirt instead of from 0.008 to 0.012, which was required in previous practice



Wood framework of Premier body showing exceptional strong method of building

pump propeller off, as the belt would automatically slip until such time as the pump impeller were free to revolve.

The three-bearing crankshaft is carried on large bearings. It does not carry counterweights, but is so designed that it has inherent balance. The shaft is drilled so as to provide pressure oil feed to each of the crank-pin bearings. The crank pins themselves are drilled out with a 1 in. diameter drill, both to lighten them and to provide an oil passage and reservoir.

The valve gear is probably the most unique feature of the engine. The features are in the design of the cams, the valve tappets, the valve rocker-arms and the lubrication of the whole valve gear. There are only three timing gears and the camshaft gear is made from Bakelite, which provides a noiseless drive.

A very ingenious method for quieting the valve gear and yet allowing the large clearance made necessary by the expansion of the aluminum cylinder wall has been worked out. It will be illustrated and described in detail in a later issue.

Delco Starting, Lighting and Ignition

The engine is equipped with a Delco independent starter, with Bendix single gear drive to the flywheel. A combination generator and ignition head is driven from the camshaft through a set of helical gears. No moving parts are visible on the electrical equipment and overrunning clutches and universal couplings are entirely eliminated. Storage is by Willard battery of 129 hr. capacity. The carburetor is Johnson, of special design, gasoline feed by Stewart vacuum system.



Premier steering wheel control levers, the large one being for shifting the gears

The main and secondary shafts of the gearset are supported on annular ball bearings throughout, individual gears being pressed onto the countershaft and held in place by four splines that are cut integral with the shaft. The use of ball bearings and this gear construction, it is claimed, makes it better for replacement purposes. The reverse idler gear is twice as large as customary, permitting the installation of a Hyatt roller bearing.

Borg & Beck Clutch

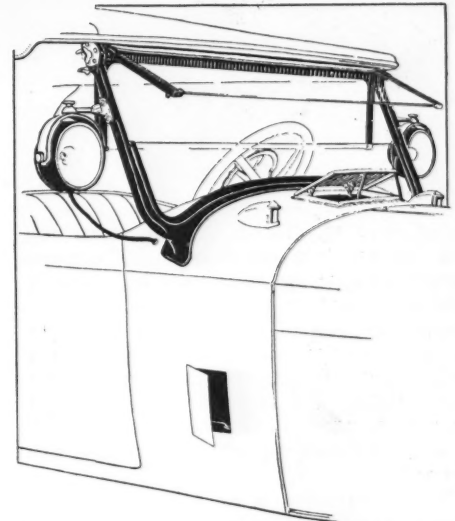
There is a spiral gear inside drive for the speedometer shaft, thereby insuring proper lubrication of this part; a new Warner speedometer is standard. Peter's universal joints and a tubular propeller shaft are provided. These joints are filled with oil and are self-lubricating for long periods. The clutch is a Borg & Beck.

The front and rear axles are of Standard Parts make. They are the heavy type, assuring maximum reliability. Spiral bevel gears are used for quietness. They, as well as the wheels, are carried on Bock roller bearings. The same is true of the front axle bearings.

The brakes on these axles are particularly large. Both external and internal brakes are mounted so as to prevent dragging and the internal brakes are heavily ribbed shoes, asbestos faced.

The frame has extra deep channel section side rails, with wide top and bottom flanges. The rear end is kicked up to clear the axle, and the running boards are carried flush with the bottom edge of the frame, thus eliminating running board shields. The front ends of the rear springs are carried inside of the frame and attached to a cross-member, thus eliminating an unsightly side spring bracket. The thirteen leaf rear springs are very long semi-elliptics, measuring 57.5 in., while the front springs are 36 in. long. The rear springs are of the Hotchkiss drive type and practically flat under load. All spring eyes are fitted with the floating Clemmons bushings, and are lubricated by the Alemite system. With this system lubricant can be spread, under high pressure, over the entire friction surfaces, insuring more thorough lubrication than is possible either from gravity type oilers or finger operated grease cups.

The open bodies, of semi-low type, have exceptional beauty, a result ob-



Two windshield searchlights which come as stock equipment

tained by the flowing contour and the peculiar curved edge, called a "Grecian line." The closed bodies are all custom built.

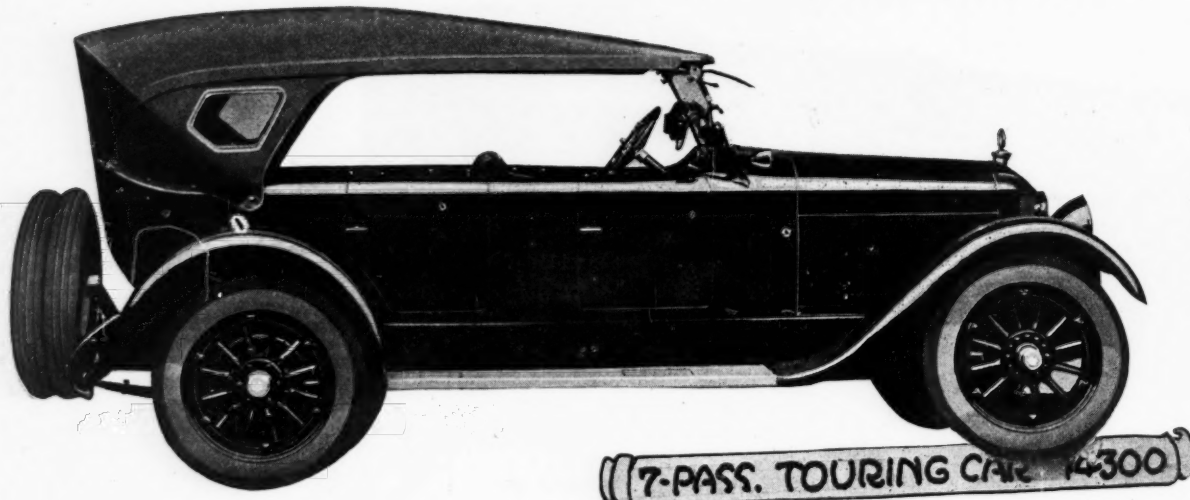
The framework of all bodies is hardwood structure, and while the doors are 3 in. thick, which permits adequate provision against distortion and rattle, the result is obtained without loss of grace.

The hood is made with a panel top in which two invisible hinges of waterproof type are mounted. These hinges are set on an angle in order that the hood may be raised and lowered in a straight position, thereby preventing the finish on the radiator shell and the body from being marred.

Many Comfort Features

The fenders are highly finished and generous in proportion, Van den Plas design. Some of the features in the bodies which contribute to the comfort of the passengers are the ventilator valves of the front compartment, the roof ventilators in the closed cars, the elaborate arrangement of special electric lights, the carrying compartments for tools in the front door, electric cigar lighters in both front and rear compartments, vanity case for the lady and a smoking set for the man in the closed cars, arm rests, pillows and hassocks trimmed to match the interior of each closed car.

Electrical equipment is exceptionally complete, with double electric headlights, both the small lower lights and the large upper one having non-glaring lenses. On the cowl are two special 2-candlepower lamps for use when standing at the curb. The instrument board lamp can be removed and is provided with 15



Premier touring car, showing the disposition of the various units and novel window in top

ft. of cord wound on a spring reel for use as an inspection lamp. Tonneau lamps illuminate both running boards and the rear door thresholds, while other lamps are placed on the rear top bow so that one can read if so disposed. On either side of the windshield special searchlights are mounted. The closed cars have stop lamps that are automatically switched on when the doors are opened.

The windshield is a rigid, manganese bronze casting (eliminating rust) and is bolted to the top of the cowl. The shield is made in three sections, the

lower half being stationary, the two upper glasses being adjustable. Both pivot at the top, one acting as a shade and the other as a wind and rain protector.

Hand buffed leather, with long straight piping, backed by inter-laced hair that cannot lump, and supported by Marshall springs, is regular equipment. The instrument board is made of solid walnut and is finished in ebony. All the metal parts, such as handles and fittings, are of solid nickel alloy (not plated) and cannot, therefore, rust or tarnish.

The Touring car tops are the semi-Victoria design, fittings. The side cur-

tains open when the doors are opened.

On each of the running boards, which are covered with linoleum, there are two Stanwood safety step plates, and on the footboard an adjustable accelerator with separate heel and foot rests, also Stanwood. Two extra ribbed-tread cord tires are mounted astern. Perfection heater in open as well as enclosed cars, Pyrene fire extinguisher, Gabriel snubbers, Kellogg tire pump, Waltham eight-day timepiece, Boyce Moto Meter and windshield cleaner.

The prices on the new Premier will be disclosed shortly.

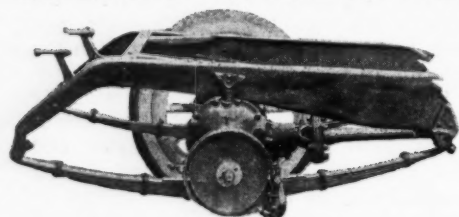
Briscoe Design Facilitates Production

Dealer Feature Is That Stock Parts Has Been Greatly Reduced

BISCOES for 1920 are roomier and more powerful than previous models and what is of as great importance to the dealer and owner, the construction is such that the servicing can be taken care of more expeditiously and at even lower cost than in the past.

The Briscoe is 5 in. longer in wheel-base for 1920 than for 1919, the figures being 109 in., as compared with 104 in. The four-cylinder engine is now 3 $\frac{3}{8}$ by 5 in., in place of 3 $\frac{1}{8}$ by 5 $\frac{1}{2}$ in., and to take care of the increased size, the tires are now 31 by 4, non-skid all around, in place of 30 by 3 $\frac{1}{2}$ in. Prices will be announced later.

In the exterior appearance of the car an unusual touch is given by the radiator being slanted slightly backward. This is a zig-zag type of radiator of large dimensions to take care of the thermosiphon cooling. A five-passenger body



Rear spring and frame layout on the new Briscoe

with full bevel line is supplied, also a sedan and a three-door coupe. The colors will be blue with chassis and fenders back. The fenders are full oval crown type with an extra wide running board. The cylindrical gasoline tank is mounted under the cowl providing gravity feed. It has a capacity of 12 $\frac{1}{2}$ gal. The wheels are wood, artillery type, the rear wheels carrying one set of brakes, and the hand brake being mounted on the rear end of the transmission gearset, operating on the drum on the rear end of the transmission shaft. The drum diameter is 8 in. The front axle is a reverse Elliott type. It is carried on ball bearings.

The improvements which make for easier maintenance and servicing have come as one of the results of a redesign of the car to facilitate production. An important feature is the fact that the number of different parts that the dealer must stock has been materially reduced.

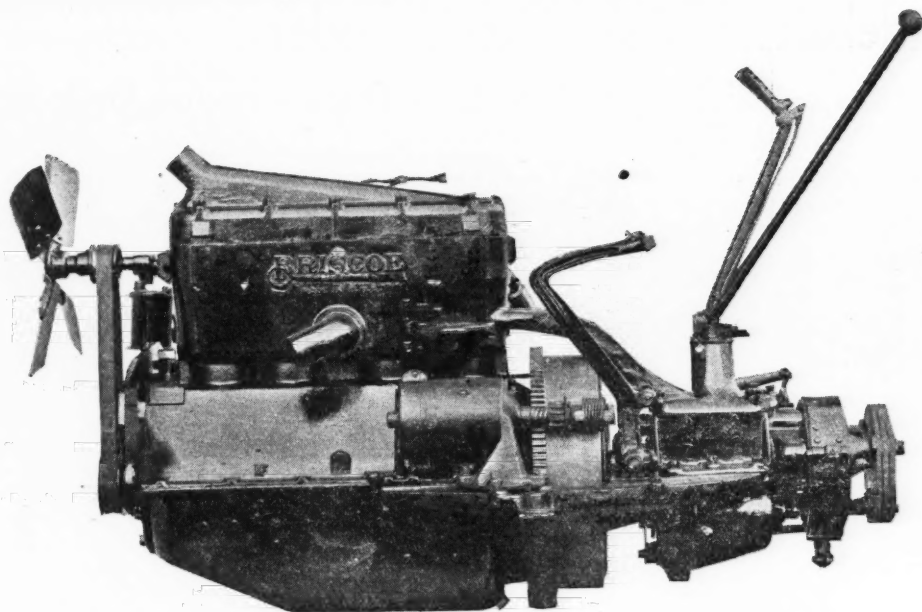
For example, the very same spring shackle is used all over the car. All spring bolts are of identical dimensions, and because the drive is taken through the springs, they are all made larger than necessary to correspond with the dimensions of the bolts at the front end of the rear spring. Rights and lefts have been eliminated to an unusual de-

gree. The use of identical parts for both sides of the car enables the dealer to carry a complete stock of parts with much less investment. Another notable example is in the spring horns, which are alike on both sides of the car. This also applies to all of the spring brackets.

The front fender irons are alike; clutch and brake pedal forgings identical; both clutch shafts and brackets the same; the rear axle center castings alike; propeller shaft, front and rear, identical, making the shaft reversible, and but one size of step bracket is used.

The use of similar size nuts for a great many uses throughout the car carries out this same principle, which will of course be keenly appreciated by dealers in their service departments. An example of where lefts and rights are interchangeable is in the running board, and a particularly good example of the savings in die equipment for stamping is that all four doors of the touring car are alike.

The Briscoe car is manufactured in large proportion by the Briscoe Motor Corp., which makes its own engines, transmission gearsets, steering gears, and front and rear axles. A four-cylinder, block-cast, L-head type engine is employed, with removable cylinder head,



Left side of new Briscoe engine, showing unit transmission and driveshaft brake

three-bearing, counter-balanced crankshaft, and mounted at four-points with a semi-flexible type of suspension. The engine follows conventional L-head practice, the valves all being mounted on the left side and the valve action covered by removable cover plate, which can be quickly detached by turning an accessible lever nut. The cylinder head and the block, which carries the upper half of the crankcase integral are iron castings, and the lower part of the crankcase is pressed steel. The pistons are also cast-iron, and carry three rings, two of which are above the piston boss and one just below the piston pin in a recess formed in the lower part of the boss.

The valves are driven by spiral gears mounted on the front end of the engine and accessible by removing a simple cover plate. The camshaft is supported on three bearings and is 1 in. in diameter. The cams are forged integrally and bear on mushroom type followers. The tappets are hollow and the valve springs are single, concentric types, the valves being interchangeable with $1\frac{1}{2}$ in. clear opening and $\frac{1}{8}$ in. lift.

Lubrication is by combined pressure feed and splash. The engine is mounted on a slight angle to provide a straight-line drive from the crankshaft to the rear axle when the car is under normal load. The oiling system is designed to take care of this, the oil being trapped in the sump below the splash tube on the connecting rod. There are direct pressure leads from the pump to the main bearings, the oil being carried in the lower part of the crankcase, which has a capacity of $1\frac{1}{2}$ gal.

The clutch is a cone type with leather facing. It has an adjustable pedal and clutch brake. Coil springs for easy engagement are placed behind the leather, there being three of these auxiliary springs. The clutch face is 2 in. for the length of contact and the cone, small diameter is $11\frac{1}{2}$ in., and the large diameter 12 in. to the outside of the leather. The gearset is a unit with the engine and is a selective type. The gears are wide faced

and both gears and shaft are heat treated, chrome steel.

Although the unit powerplant is employed, the bell housing is not solid but is a skeleton type for lightness, and the wide, horizontal flange at the gearset is utilized for the two rear suspension points in the engine.

SPECIFICATIONS OF BRISCOE

WHEELBASE109 in.

ENGINE, four-cylinder $3\frac{3}{8}$ by 5 in.

TIRES30 by $3\frac{1}{2}$ in.

CLUTCHCone

GEARSETUnit with engine

DRIVE Hotchkiss

BODY STYLESFive-passenger touring, sedan and coupe

Hotchkiss drive is employed, two flexible fabric universal joints being used and alignment being secured by pilot points in the universal. The drive is taken through the rear springs. The

rear axle is semi-floating and is a spiral bevel type mounted on Hyatt roller bearings. The differential and pinion bearings are adjustable from the outside. The chassis is mounted on semi-elliptic springs, front and rear, the spring lengths being 36 in. front and 54 in. rear. Steering is by worm and full wheel with triple adjustment.

SKELTON PLANS BIG PRODUCTION

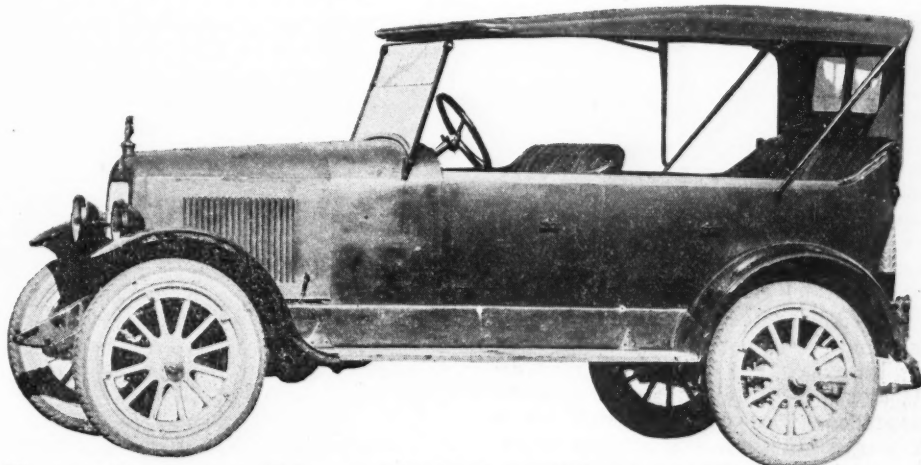
St. Louis is the home of a new car, the Skelton, which is planned for large production. L. S. Skelton, who recently bought a controlling interest in Premier Motor Corp., Indianapolis, is backing the enterprise which bears his name, Skelton Motors Corp., and to which are available the entire facilities of the St. Louis Car Co. plant. W. A. Chapman, formerly field supervisor for the Dort Motor Car Co., is vice-president and general manager of the Skelton Motors Corp.

The Skelton car has a four-cylinder motor of well recognized excellence, 32 by $3\frac{1}{2}$ tires, 112-in. wheel base, and sells for \$1,245.

There is nothing mediocre about the operating plans, for it is the intention to immediately get into such volume production that the car can be produced at minimum cost and marketed as a maximum value. It is planned to build not less than 6000 cars the first year, deliveries starting in December, while it is the hope of the men who are putting force behind this proposition, to raise this figure to 10,000 for the first twelve months.

TRUCK SEIZURES ILLEGAL

Chicago, Dec. 29—Trucks and motor cars seized while carrying liquor cannot be confiscated in the enforcement of the search and seizure law in Illinois, according to a decision handed down this week by the Illinois Supreme Court. The court held that part of the act illegal which called for confiscation of motor vehicles engaged in unlawful transportation of liquor and by this action automatically released several score trucks and cars now being held by authorities, at the same time cancelling bonds which were put up by other owners to secure the release of their vehicles.



The new five-passenger Briscoe, which has been designed and built to make service work easier

1920 Studebaker Light Six-Cylinder

Power Plant Mounted on Subframe Giving Straight Line Drive—Bodies Built in Own Factory

FOLLOWING the trend towards a light six-cylinder car the Studebaker Corp., South Bend, Mich., will produce for 1920 a 2400-lb. five-passenger car of 112 in. wheelbase, fitted with a six-cylinder engine of 3½-in. bore by 4½-in. stroke. A body design has been developed which by virtue of its long low lines gives the car an appearance of considerable length. The new Studebaker comes in three models: Five-passenger touring, five-passenger sedan and three-passenger landau-roadster.

Liberal factors of safety have been used throughout with the object of insuring minimum wear, longest possible use and freedom from mechanical troubles.

It is said that the car is balanced so perfectly that when the car is halved and quartered, an equal amount of weight will rest on the front wheels and rear wheels, or on the two right wheels and the two left wheels. This balance plays an important part in the riding qualities, comfort and road-holding ability of the car. An improved intermediate transmission with long shifting lever coupled with the disk clutch and easily operated foot pedal, make the shifting of gears easy and noiseless at all engine speeds, it is claimed.

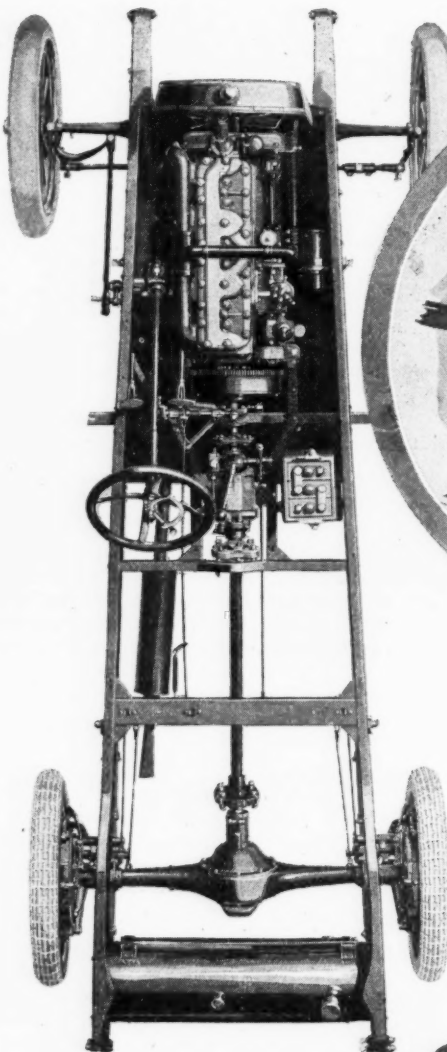
The body was designed and is manufactured complete in the Studebaker factory. It is sturdy, is finished in black enamel and upholstered in French plaited genuine leather. Inside and outside door handles are supplies.

Cord Tires Standard Equipment

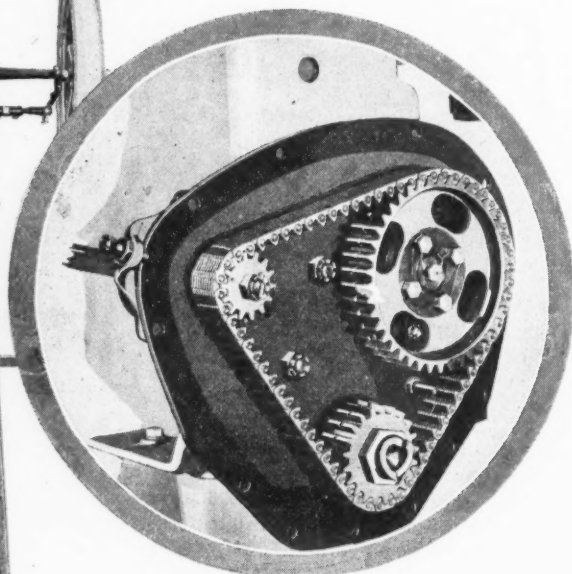
The tire size is 32 by 4 in. and regular equipment includes cord tires. The new Studebaker is the first car in its price class to equip with cord tires as standard equipment.

The Light-Six is made in three body styles, as follows: Touring car, five-passengers, weight 2400 pounds, outside and inside door handles, genuine leather upholstery, gypsy type top with bevel plate glass windows, storm curtains opening with doors; Sedan, five-passengers, four doors that swing wide open, broad windows, dome light, mohair velvet plush upholstery, ventilator at driver's feet, roof of three-ply airplane wood; Landau-Roadster, three-passengers, genuine leather upholstery, windows lower into doors and entire top folds back, converting Landau-Roadster into open three-passenger roadster, room under rear deck for tires and luggage.

The engine is cast in block, the cylinders and upper half of the crankcase being integral. The bore and stroke are 3½ by 4½ in. The engine is three-point suspended. The connecting rods are 10 in. long, an unusual length for an engine of a 3½-in. bore. These long connecting rods minimize wear on the pistons and



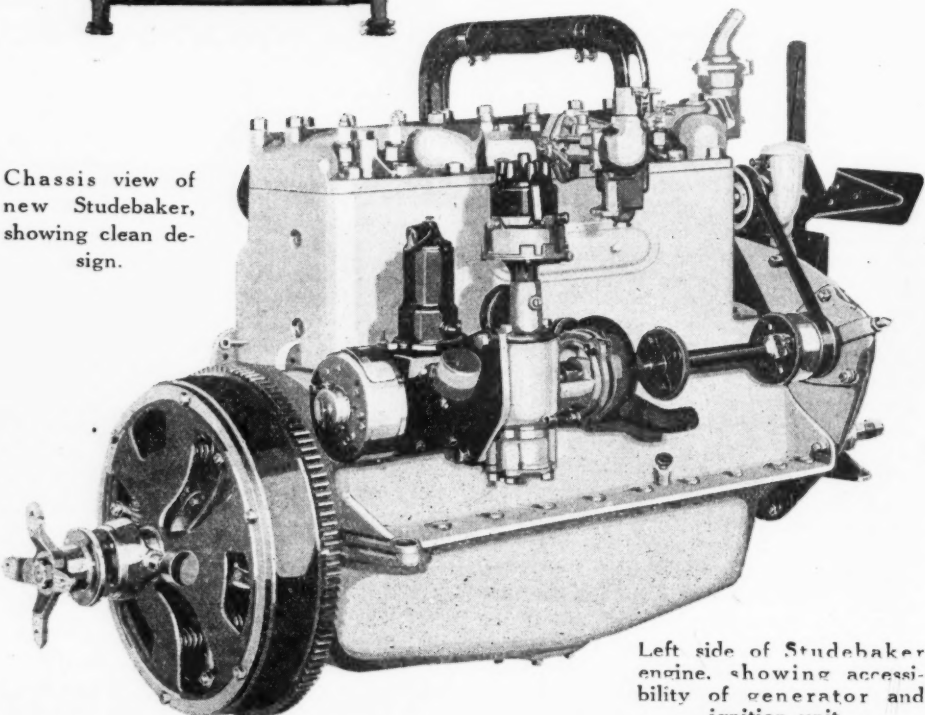
Chassis view of new Studebaker, showing clean design.



Timing gear chain on engine, showing outside adjustment.

cylinder walls, and insure a better balance and longer life. Pistons are equipped with three rings and are very light.

To insure smooth, quiet operation and balance of reciprocating parts, the crankshaft and connecting rods are machined all over. This is a noteworthy departure for a quantity production car. The engine has a detachable aluminum head in which are cast not only the usual



Left side of Studebaker engine, showing accessibility of generator and ignition unit.

SPECIFICATIONS OF STUDE- BAKER

WHEELBASE	112 in.
ENGINE, six-cylinder	3½ by 4½ in.
GEAR RATIO	4.55 to 1
WEIGHT	2400 lbs.
TIRES	32 by 4 in.
BODY STYLES	five-passenger touring, five-passenger sedan, three-passenger landau roadster

water jackets, but also all passages of the horizontal intake manifold. The horizontal feed Stromberg carburetor is bolted directly to this head. The combination of the intake manifold with the head not only shortens the distance from the carburetor to combustion chamber, but also allows intake passages to be heated directly from the combustion chamber itself. These intake passages are inclined downward from the point of contact with the carburetor, so that any unvaporized particles of gasoline leaving the carburetor will be forced to flow down hill and into a position directly in contact with the combustion chamber. The disadvantages of low grades of gasoline now in general use which prevent complete carburetion and result in the presence of a certain quantity of raw or unvaporized gasoline in the manifold are overcome by this type of construction, it is claimed. By the position of the valve openings, gases immediately upon passing through the valves are directed against an unjacketed and therefore superheated portion of the combustion chamber head. This contributes greatly to fuel economy and likewise prevents the impairment of lubrication by the seepage of raw gasoline past the pistons into the oil reservoir.

Valves at Angle

Another feature of the engine is the arrangement of the valves which are inclined at an angle of 20 deg., instead of being in the usual vertical position. Because of this angular position, gases pass more freely to and from the combustion chamber, thereby reducing heat losses and giving quicker and better combustion. The valves are operated by bell cranks with roller contacts on the cams, instead of the ordinary mushroom type of push rods. By the multiplying action of the bell cranks, a 5/16-in. lift of the valves is obtained from 3/16 in. cams. Being placed at an angle, the adjusting ends of each valve stem are in the most accessible position.

Another feature of the new engine is the convenient and compact accessory unit comprising the generator, oil pump and distributor. The entire group is removable as a unit. All bearings of this group are lubricated through an opening in the side of the crankcase by the splash from connecting rods. The coil and relay are mounted on the generator. Three

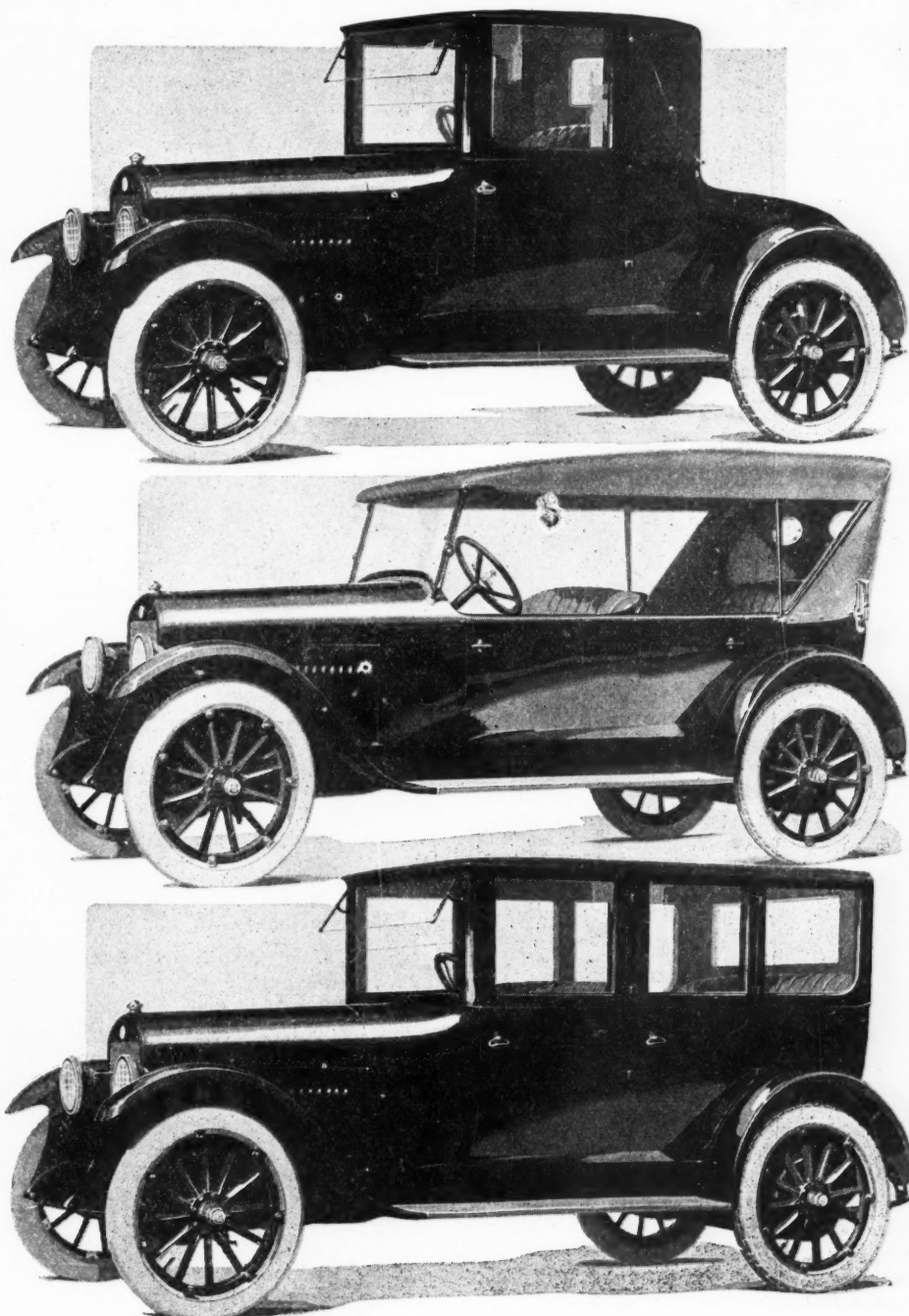
timing gears on the front of the engine are driven by a Morse silent chain, which can be easily and quickly adjusted from the outside without removing the gear case, a good service feature. The chain is lubricated by force-feed from the oil pump.

The starting motor engine engages with teeth in the flywheel through a Bendix gear. Lubrication of engine is by combination force feed and splash. The clutch is a single dry plate disk, operating in the flywheel. Between the clutch and transmission is a flexible disk coupling, which insures quietness and requires no lubrication. The transmission is the original Studebaker intermediate design, strong, simple and efficient, carried at three points on the sub-frame, which also supports the engine. There

are three speeds forward and reverse. The transmission shafts are carried on four Timken taper bearings.

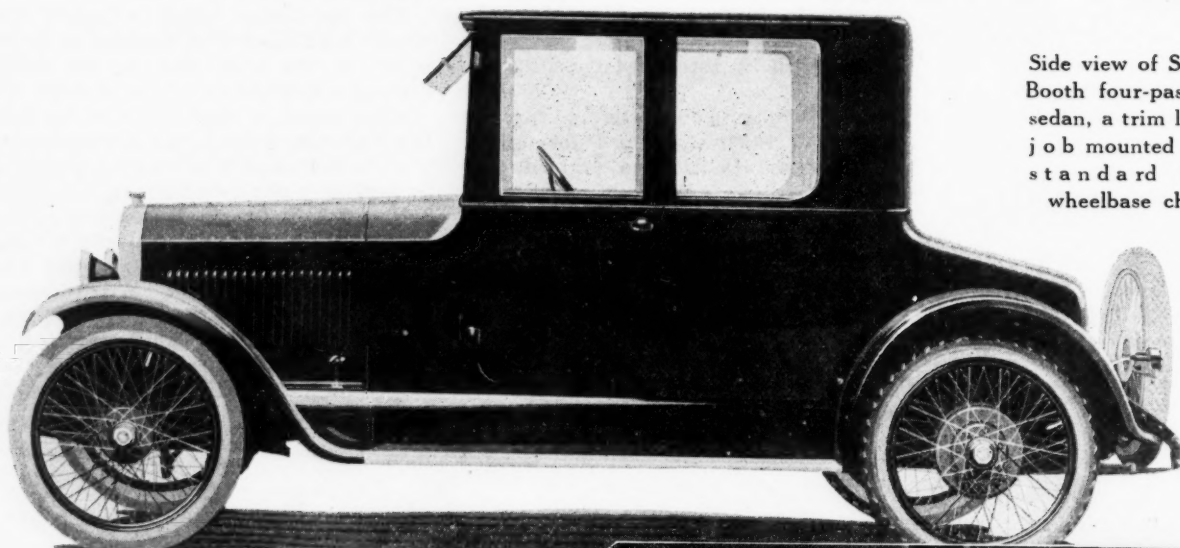
The sub-frame which supports the power plant and transmission is 1 in. lower in the rear than at the front, making a straight line drive through the tubular propeller shaft and the two flexible universal joints. The chassis frame is 6 in. deep and is narrow at the front to provide a short turning radius and a better support for the power plant. The frame widens out in the rear without any offsets, conforming to the natural line of body sills and is supported directly over the rear springs.

The rear axle is of the semi-floating type. A pressed steel housing carries two taper axle shafts. Timken adjustable bearings are used throughout.



Here are shown the three Studebaker models for 1920. They are, top to bottom, three-passenger Landau-roadster, five-passenger touring and five-passenger sedan. All are mounted on a standard 112-in wheelbase chassis.

Four Body Styles in Scripps-Booth Line



Side view of Scripps-Booth four-passenger sedan, a trim looking job mounted on the standard 115-in. wheelbase chassis

SPECIFICATIONS OF SCRIPPS-BOOTH

WHEELBASE115 in.

ENGINE, six-cylinder2 $\frac{3}{8}$ by 4 $\frac{3}{4}$

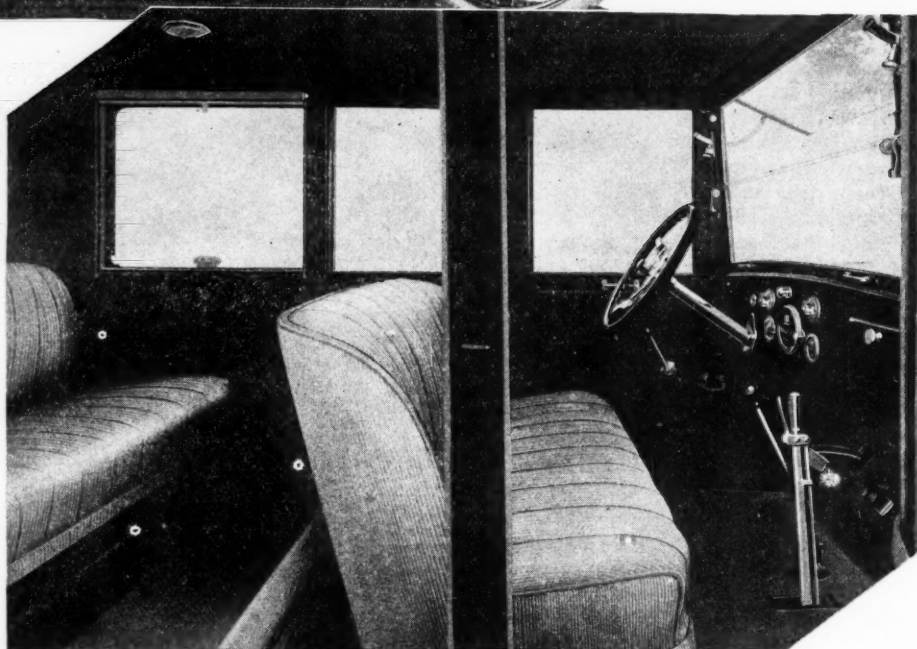
TIRES32 by 4

BODY STYLES

.....five-passenger touring, five-passenger sedan, four-passenger sedan, three-passenger roadster

CHASSIS LUBRICATION

.....Alemite system



FOUR body styles, all mounted on the same chassis, comprise the 1920 offerings of the Scripps-Booth. The bodies are a five-passenger touring, a five-passenger sedan, a three-passenger roadster and a four-passenger sedan.

The chassis wheel base is 115 inches, ample in length to afford easy riding, yet permitting a short turning radius. Extra long wide springs give a cushion-like motion that is enhanced by the deep substantially upholstered seats designed to provide the utmost rest for the body.

The six-cylinder, valve-in-head engine is of the European small-bore, high-speed design, developing more than 40 h.p. This engine is simple in construction, light in weight and accessible. A cover prevents the dust which sweeps through the radiator from settling on the valve mechanism, yet as it may be easily unlatched and raised, does not prevent access for inspection and lubrication. Above the engine is mounted an electric inspection light.

A heater fitted to the air intake of the carburetor as well as a superheated intake manifold permit these cars to burn very efficiently even the inferior grades of gasoline, which are now being sold. The Alemite system of positive lubrication substitutes a grease gun of

six hundred pounds pressure for the unhandy oil cup, thereby allowing the owner to lubricate his car without soiling his hands, while at the same time effecting a saving of many minutes.

Fittings Are Unusual

The full-lined tops of both touring car and roadster are of genuine Pantasote. Aluminum-rimmed bevel-edged plate glasses are fitted in the rear. Curtains of an exclusive Scripps-Booth pattern, swing open with the doors. They are firmly fastened on top and sides to a continuous rod of steel, the ends of which may be easily pushed into sockets provided in the moulding of the doors. This frame of steel reduces the effort of putting up the curtains to a minimum, keeps them rigid and does not allow them to flap in the wind.

The curtains are securely fastened to the bodies with but a few fasteners of an improved pattern. These fasteners are of a push-button type and while a slight pressure on the crown of any

fastener automatically releases it, they cannot become unfastened through the action of the wind. The principle under which these fasteners operate does away with the usual harmful pulling to open the curtains.

The curtains are filed away in their "ready-to-put-up" condition in a metal-lined compartment back of the front seat in the touring car. As it is never unwrinkled; their clear celluloid windows, are not likely to be broken. The multi-sprung seat cushions are upholstered in genuine leather laid in French plaits over curled hair.

To the right of the curtain storage compartment is a light for illuminating the tonneau and rear half of the curbside running board. It may be used as an extension light as well. Upon pulling it from its socket, 8 ft. of insulated wire are revealed which gives sufficient cruising radius to inspect all parts of the car. A complete set of small tools as well as the Alemite "gun" is carried in a pocket in the left-hand door of both

open models, within easy reach of the driver. The pump and jack for the roadster are attached to the under side of the rear deck.

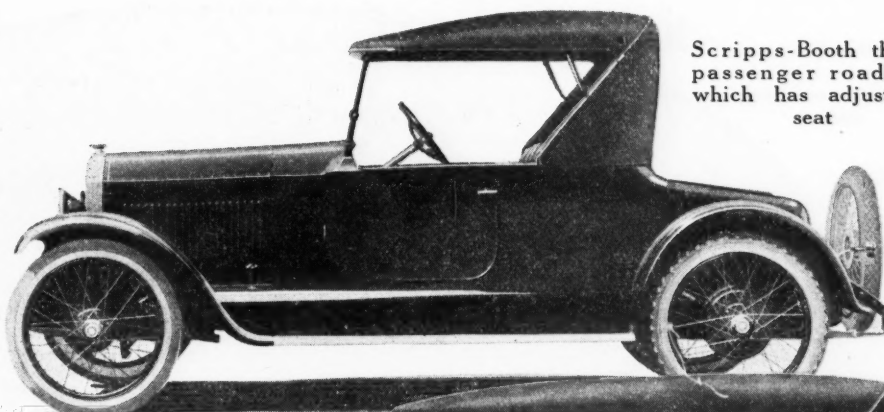
The wide seat of the roadster is large enough to seat three persons in comfort. It is upholstered like the touring car, in leather. This seat has the advantage of being adjustable. A simple thumb-screw adjustment allows the driver to move the seat either forward or back, lengthening or shortening the distance to the controls to provide the owner with a comfortable riding and driving position, regardless of his height.

Roadster Unusually Wide

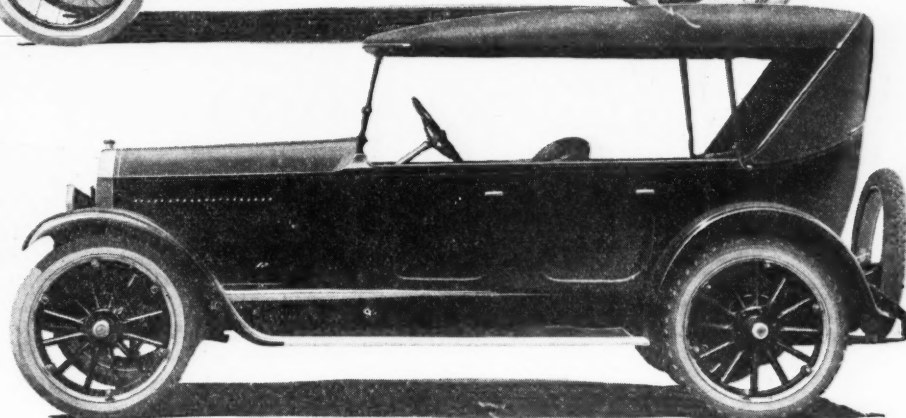
A large covered carrying space absolutely concealed behind the seat is provided in addition to the regular luggage compartment beneath the rear deck. As this cache is located in the body of the car proper and is of the same depth as the seat, fairly bulky articles may be quickly and easily deposited in it and as quickly and easily removed. This feature should appeal to those golfers and business men desiring out-of-doors recreation who wish to carry their clubs, tackle and guns with them, as it provides a safe and secret locker free from curious eyes.

There are certain features alike in both Sedan and Coupe. Both are upholstered in heavy wool coach cloth. Silk roller curtains are fitted to the rear quarter glasses, as well as the large bevel-edged rear one. All metal interior trimmings are silver-plated with dull Roman finish, which requires but a minimum of care to keep in original condition. All doors may be locked.

The plate glass windows may be low-



Scripps-Booth three-passenger roadster which has adjustable seat



Side view of Scripps-Booth five-passenger touring car; fitted with high-speed small-bore engine

ered out of sight into rattle-proof compartments in the panels of the body and doors. The door glasses are fitted with noiseless automatic lifters, which operate with ease and allow the glass to be raised or lowered to any desired posi-

tion. The bodies are entirely metal-covered, and are highly finished. A Perfection heater adds to the comfort of the passengers in cold-weather driving. Pockets with elastic tops and weighted flaps are fastened to the doors.

Three Plow Steam Tractor Product Of Iowa Concern Machine Has Short Turning Radius

THAT it is light enough to do all manner of farm work, that it will run at about one-half the fuel expense and that it will outlast the high engine speed type of gasoline tractor, are the claims made by the Steam Tractor Auto

& Mfg. Co., Sioux City, Iowa, for its new steam tractor. This tractor is of the three-plow type, with the plows suspended underneath, which can be dropped by loosening six bolts.

The price of the tractor will probably

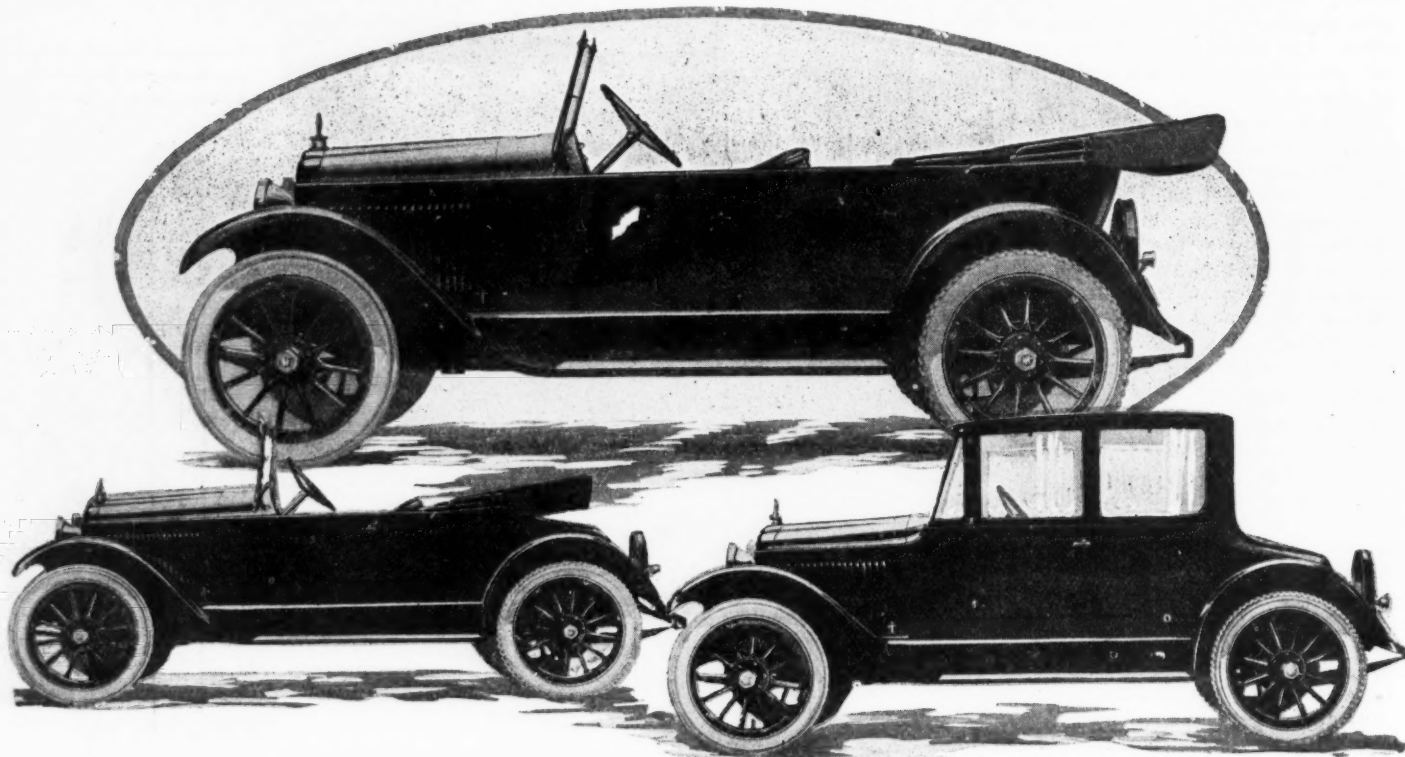
be around \$1,295. It is said to be suitable for cultivation, owing to its short turning radius. Two engines are used, each driving a rear wheel. To turn the tractor around steam is cut off from one of the engines, causing the wheel driven by that engine to stop. For cultivation it is run with the castor wheel in front. The job weighs less than 3000 lbs. and has a 35 in. clearance. Arrangements are such that the plows are raised and lowered by steam pressure.

A set of control levers is attached to each end of the tractor, as it does not have to be turned around at the ends of the field, inasmuch as a steam engine runs in either direction. The exhaust steam is carried to a condenser, cooled by an exhaust driven fan. A 40-gal. tank supplies the fuel, said to be sufficient for a day's work. At 350 r.p.m. the engine is said to develop 55 hp.

For belt work the tractor is said to be very well suited, because the flywheels are separated by about $\frac{1}{2}$ in. so that if the load is heavy a belt covering both flywheel widths can be used, while with a light load one narrow belt can be used on one flywheel only.



Steam tractor designed for all manner of farm work. Two engines are used, each driving a wheel



Three Willys-Knight models, showing, at top, five-passenger touring; left, roadster, and right, closed model.

Willys-Knight Changes of Minor Character

NUMEROUS refinements, especially in the selection and manufacture of steels which go into the car, are the chief new features of the new Willys-Knight models for 1920. Nothing radically new is to be noted in the design of the cars or the engines, most of the refinements being of a minor character.

The clutch is the simple single plate type, and is completely enclosed in a dust-proof housing. It is smooth and easy acting. Both clutch and brake pedals are adjustable to the driver's reach. The transmission is selective, with three speeds forward and one reverse. The gears are heat-treated nickel alloy steel and all shafts run on annular ball or taper roller bearings.

Noiseless thermoid universal joints and tubular drive shaft are used. The efficiency of the motor is increased by the superiority of its radiator and its natural thermo-syphon cooling system. This system means simplification because it eliminates pump and all moving parts.

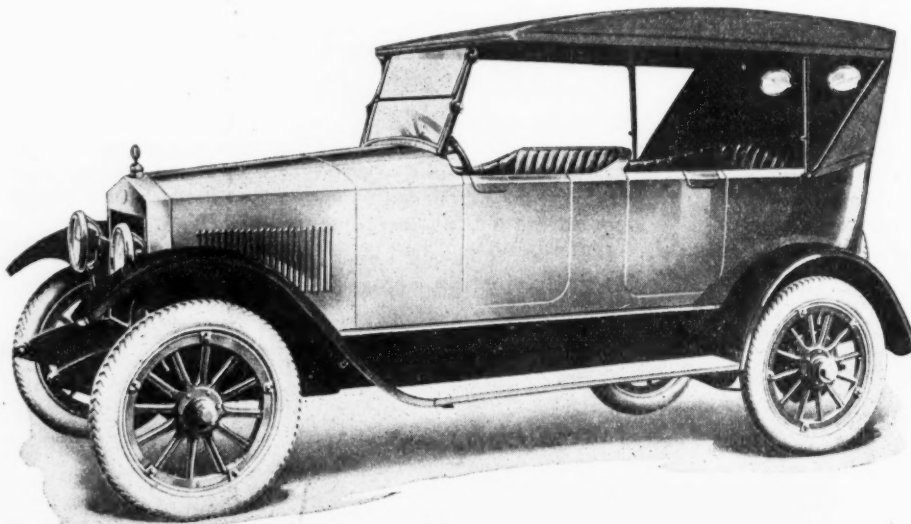
The front axle is drop forged from a single piece of chrome-vanadium steel. The steering pivots turn on taper roller bearings, as unsurpassed as is the Willys-Knight car in a matter of quality. It sets new standards of comfort. Seat cushions are tilted European fashion. They are deep and luxurious. Even the footboards are tilted at just the right angle to rest the feet comfortably. The extremely long flat flexible springs give new and delightful riding qualities. Sidesway has been reduced to the minimum because the rear springs are underslung, giving a low-hung car.

Even the Willys-Knight engine has

been given a few additional touches. Aluminum pistons, which lighten the reciprocating parts and reduce vibrations, have been used. The timing and generator gears are driven by a single,

silent chain running in oil. The Tillotson carburetor was designed especially for the new Willys-Knight car and is not only economical but sets new examples in simplicity.

Amco—A New American Car



AMCO is the name of a new American-made passenger car to be made by the American Motors, Inc., for export trade only. In other words, the Amco is a foreign car made in America but sold abroad only. The car is laid out to meet European requirements entirely, having right-hand drive.

Details as to the construction are not yet available but the car is to be an assembled proposition made up of parts

prominent in the automotive world. The wheelbase is 114 in. but the springs are exceptionally long for such a short car, 76 per cent of the wheelbase being spring underlaid. Since the car is to be sold in a foreign market special attention has been given the design of the cooling system and it is claimed by the company that cooling surface is ample to take care of strenuous service in tropical climate.

Huffman Car Uses Standard Units

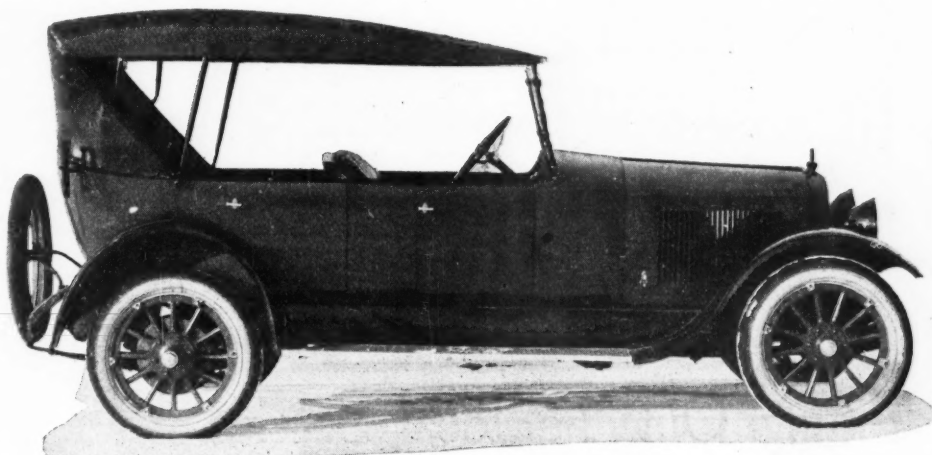
Car to Be On Market in About Two Months—Built by Concern Now Making Trucks

RECENTLY introduced is the Huffman car, made by the builders of the Huffman truck. One chassis model, equipped with three different body styles, comprises the motor car line. The chassis is assembled.

Included in the make-up are a number of parts that are familiar to all MOTOR AGE readers. Continental engine, Covert transmission, Borg & Beck clutch, Thermoid-Hardy universal joints, Salisbury axles—these make up the predominant units in the car.

The car will be on the market in about two months' time. A body factory is under contemplation, for the company is to make its own bodies. Car prices are for the touring model, \$1,795; roadster, \$1,795, and sedan \$2,675.

The five-passenger touring car shown herewith follows standard car practice and has the popular bevel edge design. The windshield has been given a slight



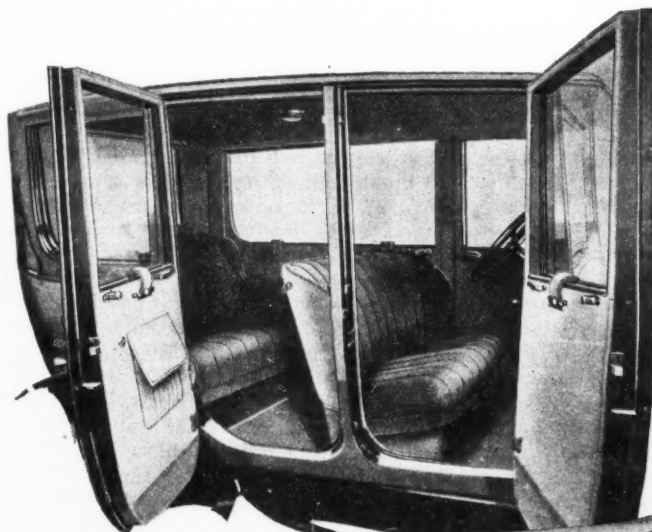
Side view of Huffman car which is to be marketed shortly.

tilt, while the top is high enough to allow passengers to get in and out the car without discomfort. Exterior door

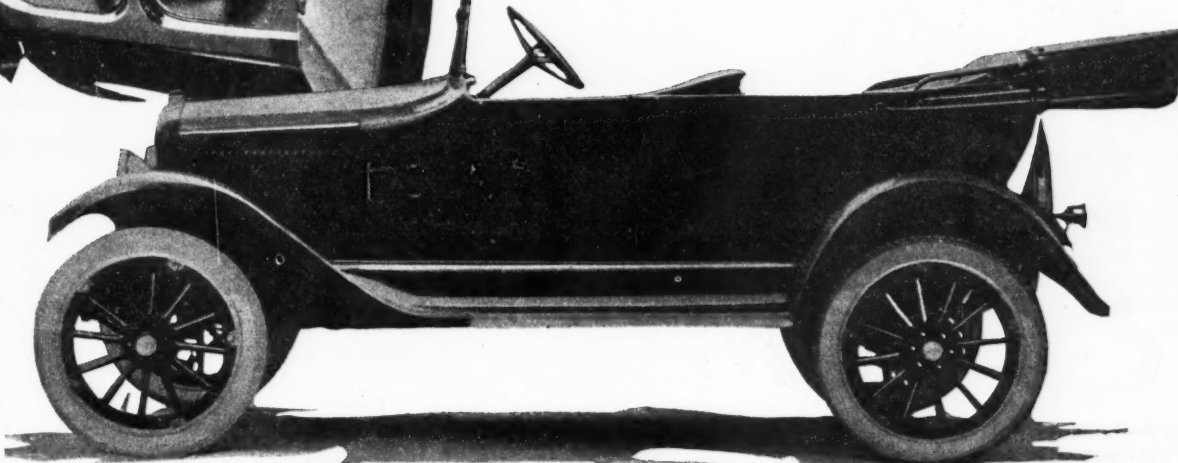
handles of square pattern and nickel-plated act as accents to relieve the broad body panel surfaces.

Overland to Concentrate On New Four

New model which was announced recently, makes its post-war premier at this year's shows



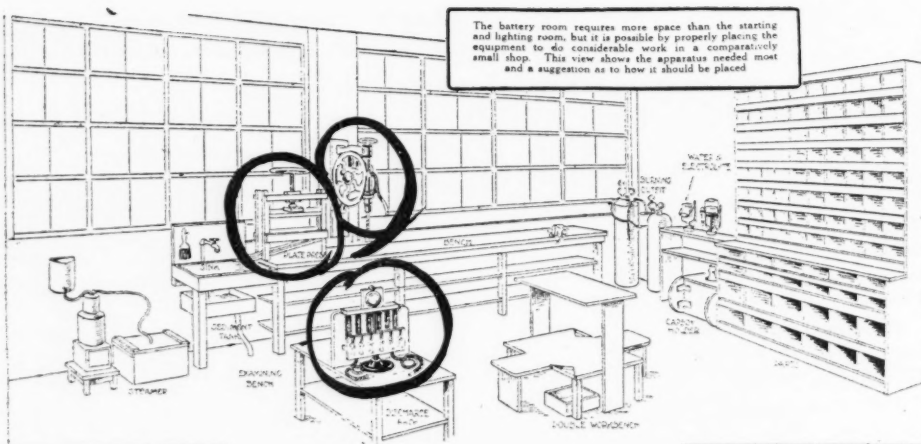
Upper view shows interior of new Overland Four sedan, giving a good idea as to the angle of placing the seats and interior appointments. Right, side view of Overland Four, which has been given much prominence owing to its novel spring suspension.



Herewith are shown two views of the new Overland Four on which the Willys-Overland Co., Toledo, will concentrate its manufacture this year. A complete description of this car has already appeared in these columns before; however, an illustration not featured before is the one showing the interior of the sedan. This body is very roomy and the upholstery has been carried out so that the occupants sit in the most comfortable position. Attention has been given to get the correct distance for comfortable driving between driver's seat and foot pedals and to locate the steering wheel and controls so that minimum effort is required for their manipulation. The company claims that these facts coupled with the three-point suspension spring layout make the new four models all that would be desired in a well-handling and performing car.

Some of the Things to Be Taken Up in Succeeding Issues

Battery Steamers.
Lead Burning Outfits.
Electrolyte Containers.
Armature Testers.
Shelving and Parts Bins.
Motor-Generator Sets Rheostats,
etc.
Rectifiers.
Charging Racks.
Magnet Chargers.
Coil Testers.
Mica Undercutters.
Testing Benches.
Battery Parts Moulds.



View in battery repair department of Ideal Service Station, showing, in circles, some of the apparatus described on these pages

Fitting Out the Ideal Service Station for Electric Service

CERTAIN battery repair jobs are common to all battery service stations and the better equipped a shop is for them the better the quality of work done. For instance, forcing the active material back into the plates, especially the negative sets, is a job that must frequently be performed in the battery shop. The job consists of placing transite boards of the proper thickness between the plates with the boards on the outside of the end plates and then compressing the whole in a plate press or in a vise. A vise may be used but in time acid will corrode it and more pressure can be obtained with the special plate press shown herewith.

The plate press shown is so built that there is no metallic part which can be reached by acid dripping from the plates. A trough can so be arranged that the acid which drips from the plates is carried off in a drain to the sink and there is therefore no rotting of the floor beneath the press and no wet acid-covered

BY B. M. IKERT
(Motor Age Editorial Staff)

In the Dec. 18 issue of Motor Age suggestions were offered as to the manner of equipping the electrical department of the Ideal Service Station, which has been featured in various ways in these pages before. In last week's issue we showed close-up views of the sink layout, double workbench, and acid container. In following issues we shall take up the descriptions of various other devices for the electrical repair department, taking first those needed in battery repairs and then the apparatus needed for work on generators, magnetoes, starting motors, coils, etc. Herewith we are showing a battery plate press, post drill, plate burning rack, battery turntable and battery discharger, all of which are very useful and some indispensable to the shop.

floor to ruin shoes. Iron is one of the greatest enemies of storage batteries, consequently the press shown herewith has been built so that there are no iron parts near the plates. Three groups of plates can be pressed at one time with this outfit, resulting in a great saving of time. The press does not come with a supporting stand, but this can be provided for to suit conditions. The trough for carrying off the acid should be painted with asphaltum paint. The press is 2 ft. 4 in. high, 2 ft. 2 in. wide, with a 14 in. hand wheel. It sells for \$32.50 and is made by the American Bureau of Engineering, Inc., Chicago.

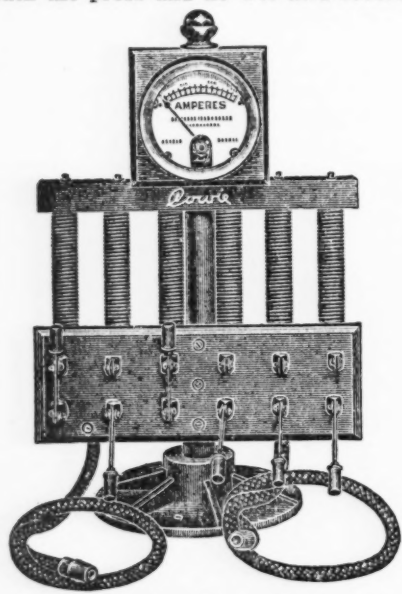
BATTERY TURNTABLE

Convenience in handling a job always makes for better workmanship. Anyone who has done any battery work knows that it is anything but an easy job to handle batteries on a bench with any degree of comfort unless some sort of apparatus is used to move the battery into other positions without a great

deal of physical exertion. To do this a concern makes a special battery turntable made of two pieces of hardwood 10 in. long by 6 in. wide and 2 in. thick. It would be well to put several of these in a shop because it readily will be seen how easily a battery can be handled with them. Especially is this true when rebuilt batteries have to be cleaned and painted and all sides have to be gotten at. In use the turntable it not fastened to the bench, so that it can be brought to the battery wherever the latter might chance to be. This is also a product of the American Bureau of Engineering, Inc., Chicago, and sells for \$4.

PLATE BURNING RACK

The plate burning rack shown on these pages is used for holding the plates in the proper position while being burned to the connecting strap. There are several of these burning racks on the market, but basically they all perform the same operation. The one shown is made with a heavy channel-iron base with two threaded posts and nuts, two spacing bars of 30 slots each and two guides for the bottom of the plates. The spacing bars are cut from steel bars and the slots accurately cut. They are made for standard $\frac{1}{8}$ in. and $3/32$ in. plates. These spacing bars come with very deep slots so that the workman can work over old groups of plates with-



Battery discharger, useful for determining the condition of a battery after rebuilding

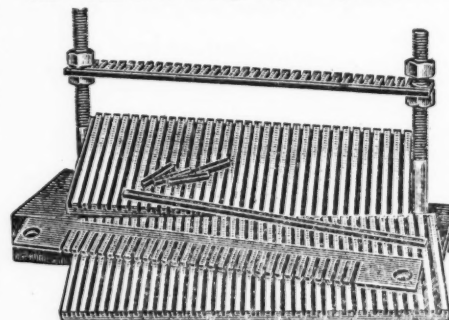
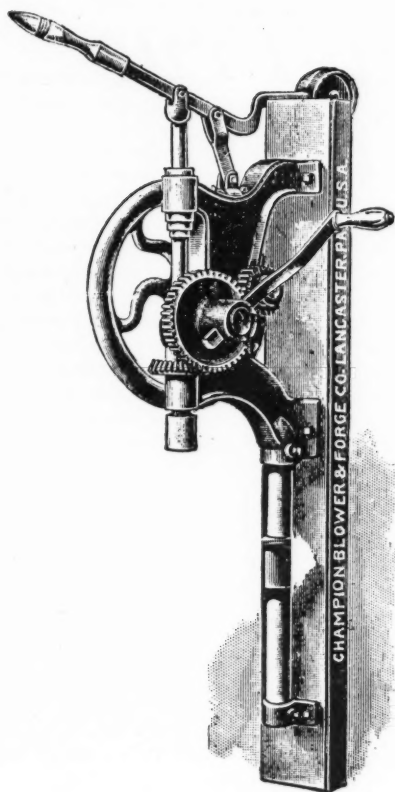


Plate burning rack, in which plates are held while connector straps are burned on



Blacksmiths post drill, handy for drilling connections

out dissembling. The burning rack sells for \$10 and is made by the E. S. Cowie Electric Co., Kansas City, Mo.

DISCHARGE RACK

Very often after a battery has been rebuilt it is desirable to make a discharge test of it to determine its condition. Battery trouble or cell trouble can be detected by the voltage dropping to a low value while the current is going through it. The condition may be determined by taking from the battery several different values of current and then measure the battery voltage and the number of ampere hours it will deliver before discharged.

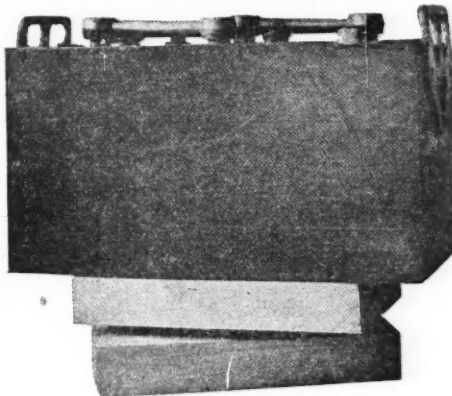
The discharge rack shown consists of one 300 ampere meter, complete with shunt and six coils of resistance varying in capacity from 20 amp. to 80 amp. on a six volt battery, doubling on a twelve volt. The capacity of each cell is marked on the rack. On a six-volt battery it is possible to run a discharge at any desired amperage from 20 amp. to 250 amp. These racks are portable and can also be used in checking the load on the starting motor by fastening both leads to the shunt and set the rack in series between the starting motor and the battery. When a battery is to be discharged at say 100 amp. it is necessary only to throw in the switch marked 80 and the one marked 20 amp.

POST DRILL

In opening up a battery to be repaired the first thing to do is drill the post connectors so they can be removed. For this a blacksmith's post drill is about the handiest piece of apparatus, because it can be mounted on the wall over the

bench, so that the batteries will be in the best position for drilling. It is possible, of course, to use a brace and bit for drilling the connectors, but this slows up the job and is not generally to be recommended in shops where much work is done. The brace and bit, however, will serve well as auxiliaries to the post drill, because very often the latter is in use when occasion arises for drilling some other battery posts. The drill should be supplied with a $\frac{5}{8}$ in., $\frac{3}{4}$ in. and $\frac{7}{8}$ in. twist drill for drilling out the various sized connectors.

Ordinarily the post drills like the one shown come with a table on which to place the work to be drilled. This table is removed from the vertical supporting



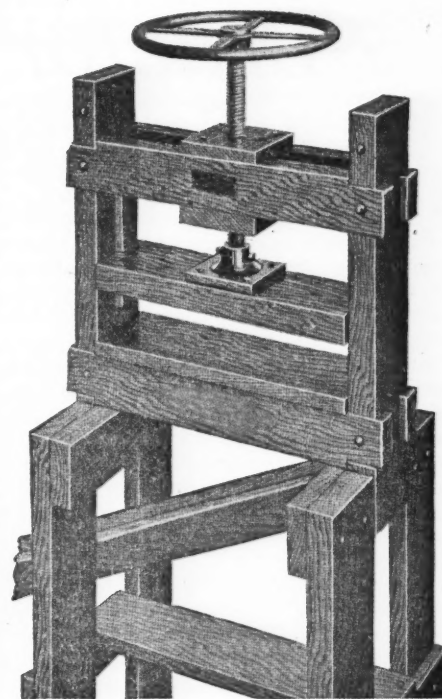
Turntable, which greatly facilitates battery work

column because it is far handier to work on batteries when they rest directly upon the work bench. Post drills can be bought from any large hardware concern or machinery house and average about \$14 in price.

DEALERS FIND THEY ARE BROKERS

Boston, Dec. 29—Into the offices of the different motor dealers a few days ago went some men from the Internal Revenue Department to advise them that they were brokers and as such owed the United States Government \$50 and interest from early in the year. It was something new to the dealers. At first they could not comprehend what the men were getting at. As the state had recently passed a law governing the sale of used cars, and the fee is to be \$50 a year some of the dealers thought that it referred to that law, and they pointed out their licenses hanging on the wall.

Then they learned this was something new from Uncle Sam. It seems that under the new Federal law anyone who deals in articles whereby they get a commission for the sale of the commodity they become brokers. And the fee for brokers was \$50. The fact that they did not know about it had no bearing on the case. The penalty for overlooking the payment was interest on the \$50. Some of the dealers tried to argue that they were not brokers, and that they were already paying fees for the privilege of selling cars. But that made no impression upon the agents. They said it was better to pay and then try to make a claim later.



Battery plate press used for forcing active material into plates

Some of the dealers felt that they would pay under protest, but the amount seemed too small to bother about. But there is the principle of the thing, for it would mean at least \$1,000,000 from the industry from the dealers alone for this interpretation of the law.

TEST MADE ON "ALCOGAS"

Chicago, Dec. 29—The official bulletin of the National Automobile Dealers' association has issued the following information regarding "Alcogas," a gasoline fuel substitution, on the authority of the Bureau of Standards, United States Department of Commerce:

"1. The Bureau has made a series of tests of a special grade of 'Alcogas' prepared especially for use in aircraft engines. While the material is understood to contain the same constituents as the motor fuel, they are probably mixed in different proportions.

"2. The tests would indicate the following:

"(a) 'Alcogas' runs without 'knock' under practically all conditions and probably with less carbonization than commercial gasoline.

"(b) A few tests in motor car operation show no marked difference in miles per gallon as compared with gasoline.

"(c) 'Alcogas' (aviation mixture) is a solvent for shellac, oils, etc., and should not be used with carburetor having shellac-covered cork floats. There is also a tendency to bring down sediment from the side of the gasoline tank and clog the strainers when 'Alcogas' is first used.

"(d) Starting difficulties probably depend upon the grade of 'Alcogas' used, hence no conclusion can be drawn from the tests made at the bureau of standards."

Tractor Business Is a True "Survival of the Fittest"

SHEER merit is the criterion by which the motor car dealer will be measured in the tractor business. Whatever he wins of success or commendation will be due in the largest measure to his own efforts. If he continues to hold the position he already has attained in the tractor trade, it will be because he is measuring up to the requirements of the position. He cannot expect special consideration nor extraordinary concessions; he must make good on his own initiative beyond the question of a doubt, and making good is an individual proposition.

The rise of the tractor to a position of importance as an article of trade has been meteoric. The progress of the business from where it was more or less a doubtful prerogative of the retail dealer, to one where it demands the full effort of a distinct organization, has taken place within a period of less than five years. During that time the principles which must govern the conduct of the business have become established and the qualifications which must characterize the successful tractor dealer have become determined.

Big Change in Distribution

No more profound and important change ever has come about in the farm operative equipment business than that which has taken the ultimate distribution of tractors out of the hands of the manufacturer and placed it in the hands of the dealer. From a position in the tractor trade which was almost negligible five years ago, the dealer has come to be the most important factor in the business.

A growing industry which bids fair to be of commanding importance and which holds out the promise of a satisfactory reward for loyal and efficient management, naturally will attract men of discernment, ability and enterprise. The tractor business is such a business and it has proven to be no exception to this rule.

The characteristic feature of the tractor business is that it has brought so many new men into the trade. There has been, naturally, more or less friction engendered during the process. The old men in the business, whatever their relation to it may have been during the years that are gone, harbored a perfectly understandable resentment at the intrusion of the new men. They went so far as to entertain the belief that some of their cherished prerogatives were being trespassed upon and they regarded the presence of the new men as due to unwarranted intruders.

Upon the other hand, the new men did not feel in any way constrained to respect the habits, traditions and relationships of the past. Here was what they conceived to be a brand new industry

THE ELEVENTH OF A SERIES

By FRED M. LOOMIS

(Motor Age Editorial Staff)

The writer of this series of articles, Fred M. Loomis, is particularly well equipped to render excellent advice to readers of Motor Age who are now, or who contemplate a little later entering the tractor business, as dealers, distributors or repair and service men.

Mr. Loomis has had nearly 50 years' experience in the tractor and farm vehicle line, both as dealer and as a writer on agricultural subjects.

This is the eleventh of a series of articles by this writer. In previous articles he has touched upon some of the more important phases of the tractor business. In future articles, Mr. Loomis will go thoroughly into problems which are constantly confronting tractor men

which promised profitable employment to any man with the requisite talent, and they believed they merely were exercising their right as free-will business men in getting in it.

There was this fundamental difference between the two classes of dealers involved: The one class thought it had an inalienable right to the business because in the past its relations to it had been more or less close and habit and trade practice considered it as a part of the equipment for conducting it.

The other class thought the business was new and in the making, that old connections had been severed by a revolution in the manner of conducting the business and that the trade was looking for new alliances in which the new class had a chance provided it was composed of men of the right talent.

Both were right.

Different Selling Conditions

In the past the tractor trade, such as it had been, was an adjunct to the implement trade, and the retail implement dealer, insofar as he had been a necessary factor in the past conduct of the trade, had an inherent right to believe that it belonged to him. And had the tractor business continued along the same lines of merchandising which had characterized its conduct for more than a generation, it is altogether likely that no one ever would have challenged the right of the retail implement dealer to control the trade nor have envied him such control.

But selling conditions changed. The plan upon which the tractor business is conducted today, and the plan upon which it is to be conducted during the future, is as different from the old way

as black is different from white. The tractor business of 1920 will not be the tractor business of 1915. The old business died a quiet death sometime during the last three years. That there are those who refuse to recognize the signs of its decease as conclusive evidence that it is no more, and who hope to reanimate the corpse by applying artificial restoratives, means nothing worth consideration. Inherent right is vested in a "dead 'un."

The new tractor business is new from top to bottom and has turned its back upon all things that are old. None of the things which used to be have any place in the new order of things. The old trade died intestate and has been succeeded by a young and vigorous giant who admits that it has no rights to dispose to any who do not deserve them. It claims the right to make new alliances without regard or respect for what was once the case. It is doing just that.

Manufacturers Need Reforming

But there is one factor which has considerable influence and which must be recognized by the new men who have come into the business. That is that while the trade itself and the manner of conducting it have changed completely, the manufacturers of tractors, many of them, have not changed quite so much. Some of them are walking along the new paths with their heads turned backward and with their eyes fixed on the past.

This accounts for the expressed preference of some of them for their old associates, the old-time tractor dealer. This accounts also for the reluctance with which some of them welcome the new dealer. This is why it is said that the new man, if he happens to be a motor car dealer, will be judged by a sterner code of performance than will be set up for the old retail implement dealer, and this is why the motor car dealer must prove that he is the better man of the two.

All this will be determined by test. Even if the old-line manufacturer retains and expresses a sentimental preference for his old companion in the trade, and even if he is disposed to be somewhat tender and considerate of him, and even if he will be disposed to be more than ordinarily patient with him, at the same time he will not for very long let such sentimental considerations blind him to the detriment of his own business interests.

The tractor manufacturer, despite his preferences and emotions, is stern enough mentally to admit recognition of the greater advantage to himself of the new system of tractor trade procedure, and ultimately his real preference will incline to that man, be he implement man or motor car man, who makes the

best record. This puts the question squarely up to the tractor dealer.

At a recent convention of retail implement dealers, a representative of the tractor manufacturers, himself an old implement man and avowedly favorably disposed to give the retail implement man the best of it, solemnly warned his hearers that the tractor manufacturers must and would find a satisfactory outlet for their goods, and that their ultimate choice of dealer would be determined by a survival of the fittest.

That is as it should be and because it will be so the chance of the motor car dealer to control at least a major portion of the tractor trade is excellent. In fact, already he does control the larger part of it.

New Stories to Come

In this connection, there have appeared in *MOTOR AGE* from time to time, articles which have told of the retail organization existent in various sections of the country. Sometime ago, there were stories on the Northwest and on the Corn Belt. There will follow stories on the Central East and New England.

These stories are stories of fact. They are the record of personal investigation and observation. There is no disposition to alter or distort anything, merely to tell the actual things. Neither alteration nor distortion has been indulged. If the facts as set forth do not square with the preconceived notions of any reader, friendly or otherwise, regarding what is the condition in the sections of the country written of, then all the writer can suggest is that he go over the same ground and see for himself what the writer has seen.

PROGRAM FOR TRANSPORT CONFERENCES ANNOUNCED

Announcement has been made that the program is practically completed for the highway transport conferences to be held in conjunction with the National Motor Truck Shows. Inaugural sessions of the conferences will take place on opening night at both shows, when the speakers will be men of national prominence, and the general subjects of highways and motor transportation will be discussed, with special reference to the economic aspects.

Afternoon and evening sessions will be held daily during the remaining six days of each show. Afternoon sessions are intended primarily for those engaged in the motor truck business, including manufacturing, distributing and service. Discussion will center upon such subjects as merchandising and advertising, legislation for highway improvement, sales plans, service, the motor transportation idea, and opportunities in rural sections.

Interests of motor truck owners and operators, shippers and the general public have been the primary consideration in arranging the evening program, for which the subjects scheduled are motor vehicles in passenger transportation; increasing motor haulage efficiency by such means as routing, loading and unloading devices, and incentives for drivers and helpers; such aids to efficiency as trailers and pneumatic tires; truck and railroad freighting; highway and motor transport; rural motor express as an investment and as an aid to producer and consumer.

Development of the rural motor express is proceeding rapidly as a result of the need to increase production and decrease cost of food. Perishable products may be brought to market in good condition and small farmers are combining in co-operative associations for using a single truck to haul food products to cities and bring back supplies on the return trip.

Better marketing and distribution to decrease cost of food by eliminating superfluous handlings of food products is a phase of the conference discussions which should prove especially interesting to the general public, although something of profit may be gained by a visit to any of the sessions of the very comprehensive program.

OWNERS TO FIGHT OHIO TAX

Columbus, Ohio, Dec. 29—The board of trustees of the Ohio Automobile Association, which has affiliated with it a large majority of the automobile clubs of the state met at the Deshler Hotel last week and adopted a resolution to combat the newly enacted graduated automobile tax law in the courts on the grounds of unconstitutionality. The board resolved itself into a special committee and immediately employed Judge Walter Means, of Cleveland, and Attorney C. D. Saviers, of Columbus, as legal advisers in the case. The two attorneys will prepare a petition, which will likely be filed in the Columbus courts, claiming that the law is unconstitutional on the grounds that it is class legislation. A similar bill enacted several years ago was defeated in the courts.

ALLISON GETS LINCOLN CAR

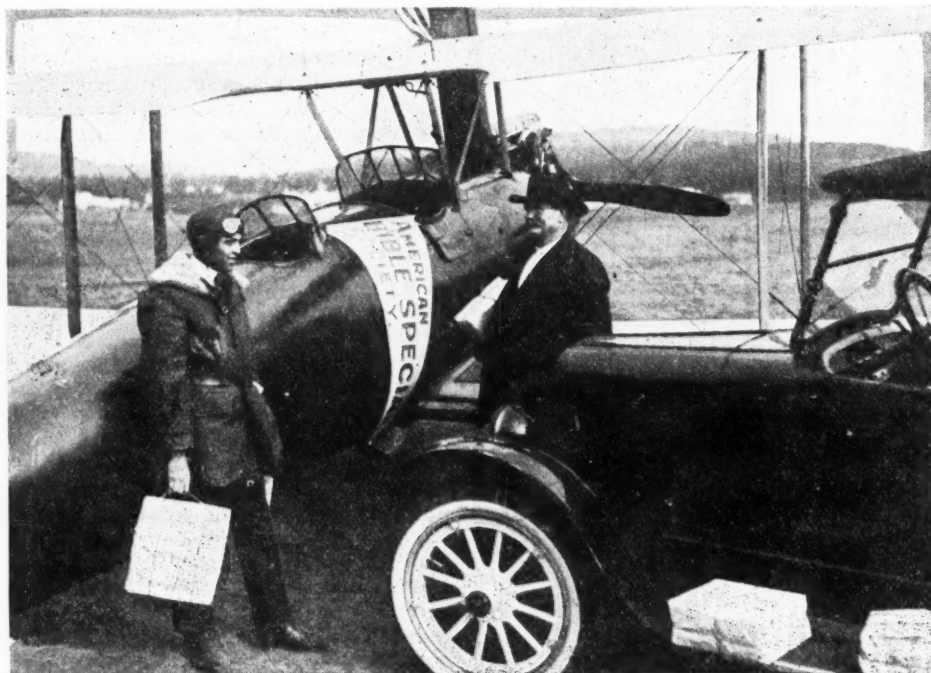
Chicago, Dec. 29—H. M. Allison, former president of the Packard Motor Car Co. of Chicago, and Lewis E. Rood, formerly associated with Dodge Brothers, have been appointed Chicago distributors for the new Lincoln Motor Co. The appointment of Messrs. Allison and Rood had been rumored in local automobile circles for several weeks but no definite announcement was made this week. It is understood the Lincoln companies had thirty-one applicants for the Chicago territory and that the local distributors have been promised a considerable percentage of the total output for the Chicago field.

Mr. Allison was head of the Chicago Packard distribution until a few months ago when the firm was sold to the Packard Motor Car Co. of Detroit and a factory branch established here. In the time he was associated with the Packard, sales in the Chicago territory increased from \$200,000 to more than \$5,000,000 annually.

TOLEDO SHOW DATES SET

Toledo, Ohio, Dec. 29—The annual Toledo Automobile Show will be held at the Terminal Auditorium Feb. 2 to 7. The show will be given under the auspices of the Toledo Auto Shows Co., of which Charles E. Dorn is president; Joseph Gasser, vice-president; John Yoke, secretary, and J. W. Banting, treasurer.

Proving That We're Slow



A few weeks ago, *Motor Age* published a story about how religion had adopted the motor car. But hardly had we caught our breath after writing this story than—Bam—the American Bible Society slips us this picture showing how it has adopted the airplane. Showing you have to step fast even to keep up with religion in these hectic days

Garage Planning

Service Station Arrangements

No. 163

SALES AND SERVICE BUILDING

We are at present located on a corner in a building 120 ft. on the main street by 50 ft. on the side street. This is much too small so we have secured an option on the property directly in the rear, also 120 ft. by 50 ft. I am enclosing a rough sketch of our present layout together with the location and size of the proposed addition. If your architectural department will make a sketch for me somewhat along the lines I will suggest it will assist me in getting some sort of an estimate on the cost of making the changes in our present quarters and constructing the new. As you will see on the sketch our show room at present is 79 ft. long on the main street with glass front the entire length. The following is about what we want: Sales room about 60 ft. on the front street by 50 ft. deep. Tire department in store adjoining show room. Two stores to be rented out. Repair shop for 10 or 12 cars. Space for lathe, drill press, arbor press, grinder, etc. Stock room, tool room, and oil room arranged so one man can handle it. Service department in front end of addition, which will also be used for parking cars. Service manager's office. Double wash rack. Shop washroom and toilets. Office washroom and toilet. General office large enough for 3 desks, files, etc., with a private office having very low partitions. Would also like small place for office cloakroom and stationery. Stores also should have toilets somewhere.

Note:—Stores and tire department might be shortened up to accommodate wash rooms and locker rooms; 38-ft.

MOTOR Age is receiving many inquiries or garage plans which do not give sufficient information to permit an intelligent reply. There are certain things which should be known to lay out the proper plan for a garage, and inquiries are urged in asking for such plans to be sure to include the following information:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of acres on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

stores would undoubtedly be just as valuable as 50-ft. stores.

I will very much appreciate any information you can give. Perhaps you can suggest a much better arrangement.—A dealer, Minnesota.

The only objection that we can see with this layout is that there is no place from which oil can be handled. The logical place to handle gasoline sales is in the front of the accessory store, in

order to bring gasoline customers in contact with the accessories and it is a fact that most of the bulk oil sold will be bought by the same gasoline customers. You will have to devise some means of getting oil to cars at the curb other than carrying it in a quart measure through the store. Some sort of a small cart with tanks and drip pans might be used and kept in front during busy periods.

The tire repair shop is also rather out of the way but if tire repairs are handled in the accessory store the stock keeper can manage the transfer to and from the shop.

Aside from these objections your layout seems very good and we can see no reason why you should not be very well fixed.

No. 164

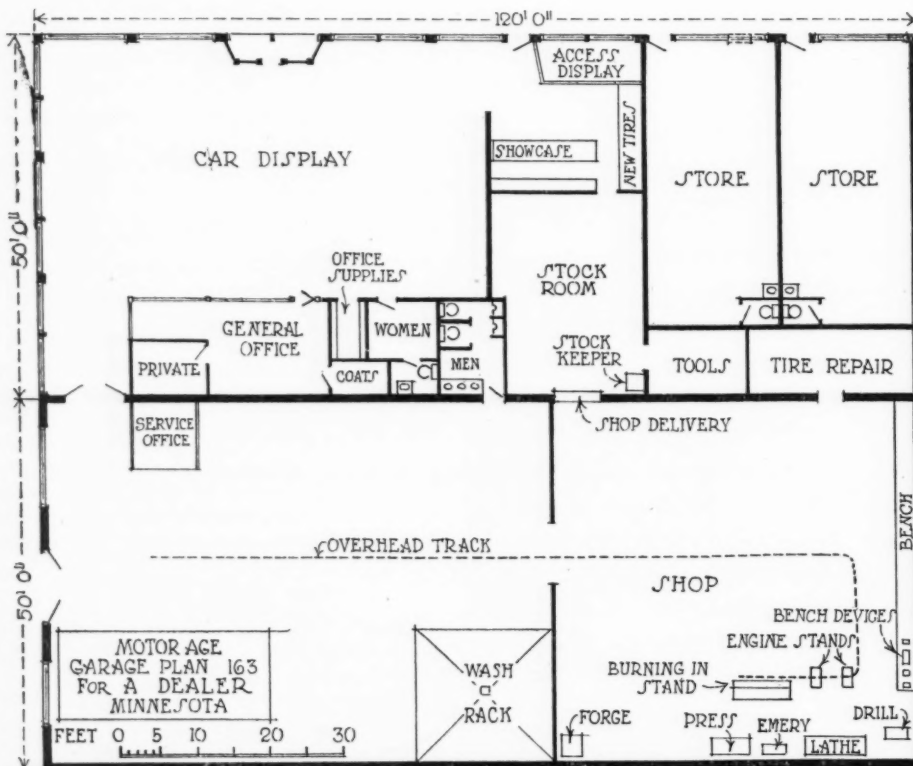
AUTOMOBILE LAUNDRY

I would like to get a little idea of a plan for an automobile laundry and would like to start on as small a capital as possible and some of the prices they charge for washing cars. I think that I could make good if I got a good location and gave the best of service. So if your department would give me a few suggestions I will sure appreciate it. Please do not use my name and address as I don't want to let it get out as it may interfere with my position. So will be glad to hear from you and thank you for same.—Texan, Dallas, Tex.

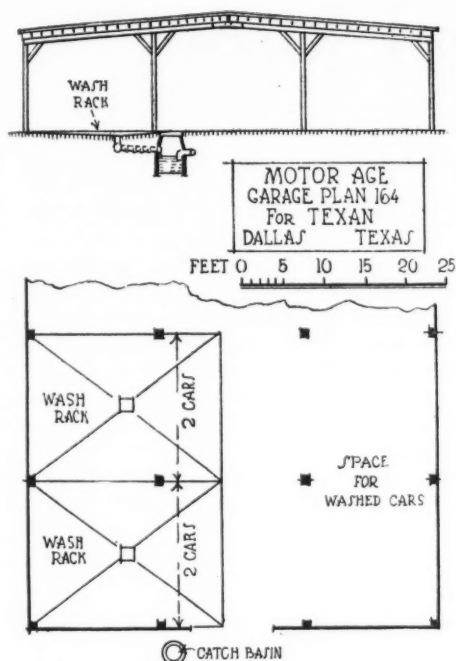
If your capital is limited and you probably will not want to expend very much on building, consequently our advice is that you first get a good location on a 50-foot lot, then decide about how much you can spend. Lay a cement floor with proper drains the full width of your fifty feet. This is the most essential part of the plant, especially in your section of the country where no great amount of artificial heat is required.

Wood can of course be used for floors but it gets water soaked and mouldy, the water runs through the cracks and washes away the supports and the whole thing rots away and cars begin to break through in a surprisingly short time. The structure can be handled in most any way that economy demands. If you give good service and your prices are right, customers will not care what kind of a building you have as long as it is clean and protects their cars from the weather.

Washing brings different prices according to location, in this vicinity, \$1.50 to \$2 is charged, wire wheels are 50 cents extra and polishing is extra. In Chicago the prices are higher than this.



No. 163. Plan for sales and service station.



No. 164. Building planned for washing cars

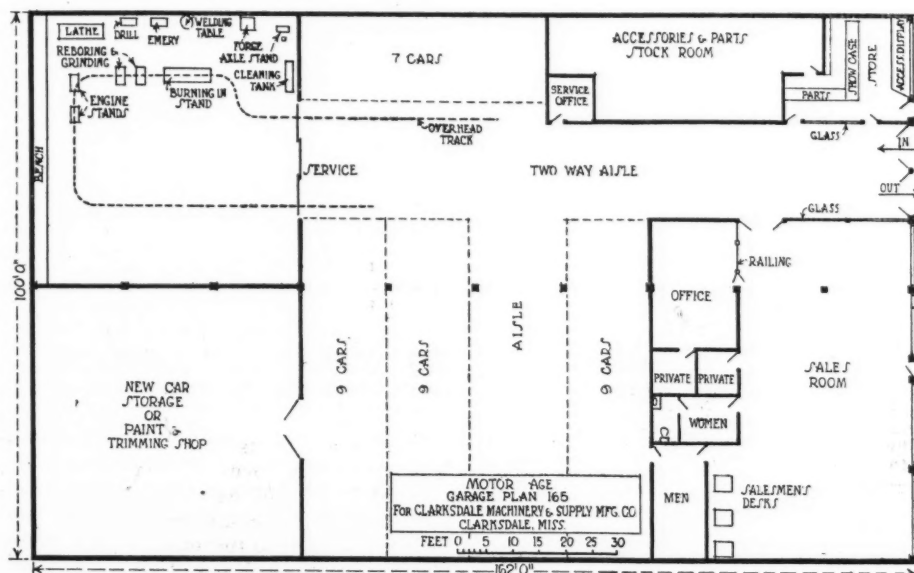
You might start with one or two sections and add more in the rear as business increases as shown on your plan.

No. 165

SALES AND SERVICE STATION

We are going to build a sales and service station. The lot is an inside lot of 100x162 ft. We would like for you to give us some information as to the first floor arrangement. We are expecting to build a one-story building with a cellar at the rear of the building large enough for heating the building and storage of fuel. We only handle the Ford cars and trucks. We want something nice for the front of the building as well as a nice show room, shop, accessories and parts room.

We have been considering the Truscon Steel Company building material, of Youngstown, Ohio. We of course expected to use either pressed brick or tile for our front. So would thank you to please give us whatever information you can.—



No. 165. Plan for sales and service station

Clarkdale Machinery Co., Clarkdale, Miss.

This arrangement shows a two-way entrance which is a good scheme because it does not break up your front as much as two separate entrances would. The service office is located where the manager can inspect and estimate the cost of work on cars as they are brought in with very little effort on his part or that of the customer.

Cars requiring extensive service may be run into the shop, while those upon which slight repairs are to be made may be kept outside and the defective or broken parts taken into the shop by hand or on the overhead conveyer.

At present dealers are not troubled with the storage space for new cars as much as cars for their space so that the large room opposite the shop might be used as a painting and trimming department.

This building would best be built in two 50-ft. sections with a row of posts through the center to carry the abutting ends of the trusses. The accessory store is arranged to handle Ford parts as well and the shop will buy its parts over the counter with a requisition just as the customer will with cash.

A front for this building should give no trouble as it would be a solid glass store front proposition with perhaps a decorative upper part of brick or stucco on tile to hide the trusses.

No. 167

REMODELING PRESENT BUILDING

I enclose drawing of my two-story building with living rooms upstairs, and in two rooms first floor, with small basement steam heated throughout.

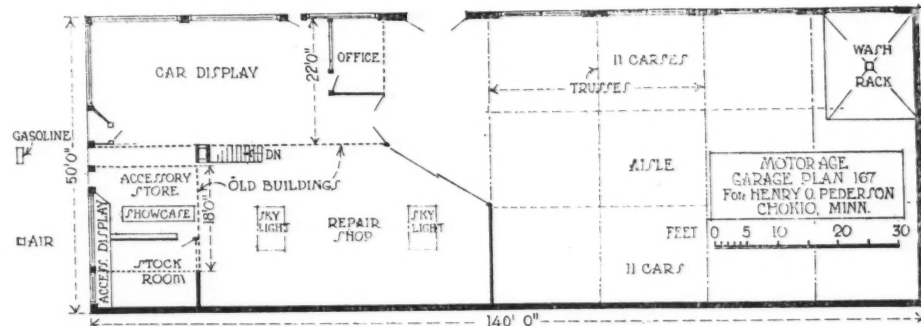
Would you make a front entrance? If so, I could take away the north wing of the building. If I could sell for value, do you think it best to sell the building all new? I will use hollow tile building block for what I erect. What would you advise the best and cheapest roof, and how to support it? Where should I place my gas, station oil supply and free air?

Would you advise side street entrance and rear or front and side street entrances? Would a flat roof be as good and easy to support as a gable roof? How about corrugated steel for roof?

I have city water and sewer and want a wash room. I should say that I need storage for thirty cars and about four in the work shop.—Henry Pederson, Chokio, Minn.

There is no question but that an entire new building would be better than the one you would have by remodeling and adding to this one, but on the other hand we believe you could make a very good and serviceable structure if remodeled in some such way as shown.

We have used the whole length of the lot because even then you cannot accommodate thirty cars. Very little could be gained by a front entrance and considerable loss of space and more extensive alterations would be necessary.



No. 167. Remodeling present building

There is a wide choice in trusses suitable for this building, the round topped lattice truss is one of the least expensive and is used almost universally in Chicago, flat topped steel or wood trusses are thoroughly practical, however as is also the gabled truss. Corrugated steel is a mistake for a roof in our estimation; it is hot in summer, cold in winter, needs constant attention with paint which alone at the present price of oil would in a short time surpass the cost of a good asphalt roofing. Iron roofs very often rust from the under side due to condensation of moisture in cool weather and it is almost, if not quite impossible to get at them with paint. If you do not want to go to the expense of trusses you could use a double row of posts about 12 to 14 ft. from each wall spaced either 14 ft. between them. Posts are always in the way and cause no end of damage to fenders, etc., making trusses and a clear floor much better in the long run.

The Readers' Clearing House

Questions and Answers

OVERLAND ELECTRIC SYSTEM

Q Publish wiring diagram of 1916 Overland 83.

- 2—Where is the dimmer coil?
- 3—How are connections made to switch?
- 4—How are connections made to coil?
- 5—Show how to connect generator with battery.—F. H. Lewis, Sharon, Pa.

1—The diagram for this car is shown in Fig. 2.

2—The dimming scheme used on this car is of the type that places both lamps in series when the dimmer switch is pushed.

3—The diagram shows these connections.

4—See the illustration.

5—See Fig. 2.

NORTH EAST SYSTEM ON CHALMERS

Q—Show how to install a North East starter and generator unit on a Model E four cylinder Chalmers car No. 6526.

2—What year was this car put out?

3—Where can a water pump, wheel and shaft be secured for this car?—R. B. Biggs, River Road Garage, Tiffin, Iowa.

1—Because of the difficulty and the expense so attached we do not advise that you install a starter on this model Chalmers engine, an illustration of

Conducted by Roy E. Berg
(Motor Age Editorial Staff)

THIS department is conducted to assist dealers, service stations, garagemen and their mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Motor Age reserves the right to answer the query by personal letter or through these columns.

which is shown in Fig. 3. It will be rather difficult to install a starter because there are no teeth on the flywheel and the cam shaft and accessory drive shaft are not strong enough, or rather are not designed to handle such powerful starting torques as are necessary to starting torques as are necessary to drive the engine. A generator can be installed by fitting it to the magneto drive shaft. By making a suitable

bracket to fit over the bolts on the timing housing and then securing a gear for chain drive to the magneto shaft, to drive the generator, it seems this part of the problem will be solved.

2—This car was made in 1912.

3—Write the Chalmers Motor Car Co., Detroit.

GEARS FOR CHEVROLET CAR

Q—Where can 3 to 1 gears be obtained for a Chevrolet, 490?

2—Will Ford 3 to 1 gears fit accurately in the Chevrolet?

3—What is the maximum r.p.m. of the Chevrolet engine?

4—What speed should a Chevrolet roadster make equipped with 3 to 1 gears and 31 by 3.75 in. tires?—R. Midgeley, Menlo Park, Calif.

1-2—Inasmuch as the Ford gears are interchangeable with the Chevrolet gears you can procure these special gears from any specialty parts manufacturing company.

3—About 2200 r.p.m.

4—About 65 m.p.h.

RE-CHARGING DRY CELL BATTERIES

Q—Has there been any advance in dry cells batteries, that is the recharging of them while in operation or otherwise?—L. E. Griffin, Bartlett, Tenn.

Not that we know of. A dry cell is self consuming and when once the zinc used in its construction is changed to a compound of zinc, its life is gone. It is useless to try to recharge a dry cell and secure any definite length of life from the renewed cell. By soaking the cell in a solution of salomoniac and punching several fine holes in its side so this solution will have time to soak in, the battery will be partially rebuilt, so to speak. Care should be taken when punching the holes, so see that the center carbon electrode is not injured. After the cell has "charged" for a few hours the holes should be filled with sealing wax.

INCREASING GENERATOR CHARGE

Q—Is it possible to increase the charging rate of generator to battery on an Allen model 34 M, equipped with a Westinghouse ignition system? If so, how can it be done?

2—It is now equipped with a voltmeter. Would an ammeter give more accurate readings of the charging of battery? If so, instruct how to install one.—T. A. Davis, McKeesport, Penna.

1—This car is equipped with Westinghouse system, using a regulator. By removing the cover of the regulator a small screw will be exposed on the top of the regulating mechanism. By turning this screw to increase the tension on the spring the voltage of the system will

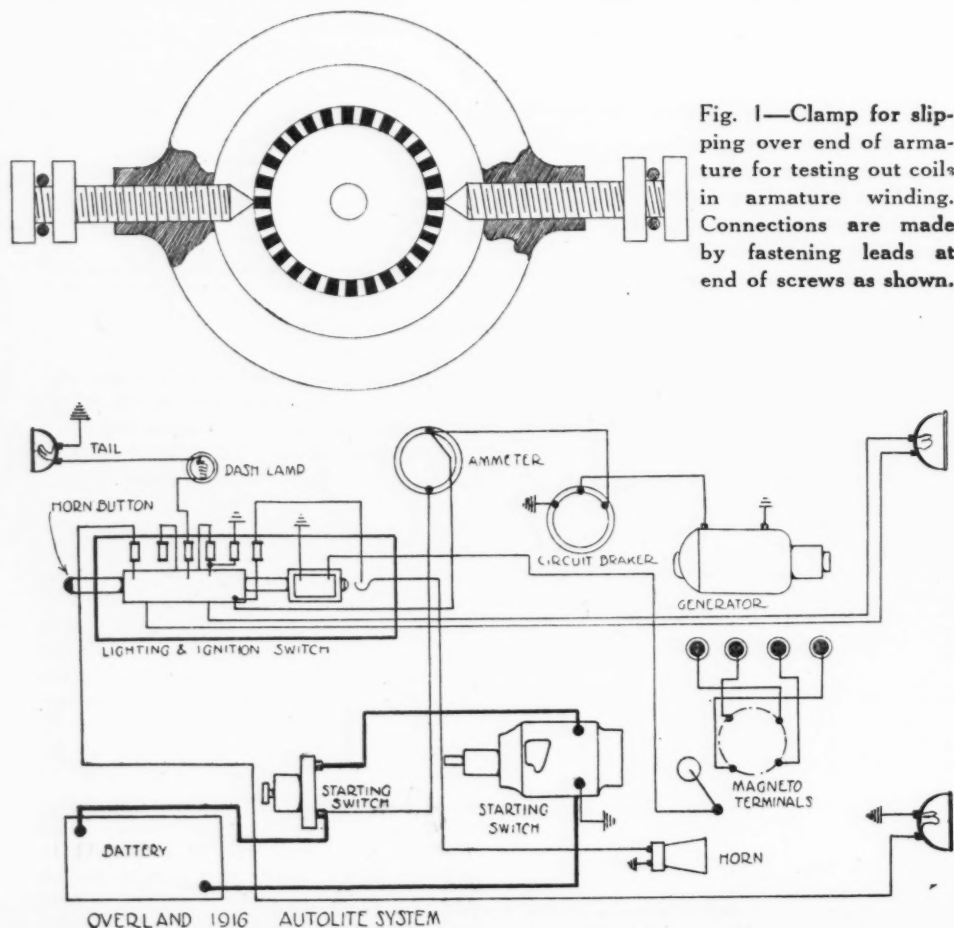


Fig. 2—Wiring system on the Overland 83

Fig. 1—Clamp for slipping over end of armature for testing out coils in armature winding. Connections are made by fastening leads at end of screws as shown.

be automatically raised. This will increase the charging rate.

2—An ammeter is much the better of the two instruments. But since you already have the voltmeter it will be a good idea to install in addition an ammeter.

REMOVING BATTERY FROM CAR

Q—Is it advisable to remove the battery from the car in cold weather or will it harm it?—A. M. Schmitz, St. Louis, Mo.

1—Yes, unless you are going to use the car. The battery should also be kept fully charged and it will be wise to take it to a charging station to be kept in order until ready for use in the spring. A battery that is not charged and that has not sufficient water will freeze and be ruined.

LOCATING MAGNETO TROUBLES

Q—Give information for positive test to locate troubles in magnetos, generators, etc., as used by large service stations.

2—How can a heavy discharge set that can also be used for discharging batteries at a low rate be made?

3—Can a Heinze starter be incorporated in a testing bench to operate off of a motor generator of 32 volt battery capacity using rheostat to give variable speeds?

4—Can it be made to run backwards?

5—Give outline to build a successful testing bench.—Chas. E. Baird, U. S. L. Battery Service Station, Perry, Ia.

1—We have described from time to time so many different schemes, all of them used a great deal by manufacturers and service stations, that we do not feel justified in describing here at length more than one process. The illustration, Fig. 1, shows a contrivance very easily made that is clamped around the armature and a small current fed through the

To assist readers in obtaining as a unit all information on a certain subject MOTOR AGE segregates inquiries in this department into divisions of allied nature. Questions pertaining to engines are answered under that head and so on.

THE ELECTRIC SYSTEM

F. H. Lewis..... Sharon, Pa.
R. H. Biggs, River Road Garage..... Tiffin, Ia.
C. B. Jones..... Bakers Corner, Ind.
L. E. Griffin..... Bartlett, Tenn.
T. A. Davis..... McKeesport, Pa.
A. M. Schmitz..... St. Louis, Mo.
Chas. E. Baird, U. S. L. Battery Service Station..... Perry, Ia.
Robert L. Bahre..... Daly City, Cal.

CARBURETION

Thomas Hofmeister..... Fullerton, Md.
Clifford McDowell..... Cozad, Neb.
F. A. Davis..... McKeesport, Pa.

ENGINE MAINTENANCE

A. D. Gise Motor Co..... Coffeyville, Kans.
Fred A. Cross..... St. Louis, Mo.
Bryan Redinus..... Ashkum, Ill.
Thomas Hofmeister..... Fullerton, Md.
P. B. Rice, Rice's Garage..... Dublin, Ga.

MISCELLANEOUS

C. Whitney..... Dill River, Can.
J. Paul Martin, Automotive Repair Co..... Wilkinsburg, Pa.
L. J. Duplant, Auto Repair and Supply..... Titusville, Pa.
Fred Harlin..... Itasca, Tex.
A. M. Schmitz..... St. Louis, Mo.
Reader..... Dillon, Mont.

REBUILDING

Herman Meyers..... East Moline, Ill.
Merrill Prober..... Carpenter, Ia.

armature by means of this clamp. Place a lamp in series with the circuit and then lead the current into the armature through the binding posts of this clamp. A millivoltmeter is then used to deter-

mine the drop between adjacent segments. If the drop is found to be very large, an open circuit is causing the trouble. If the drop is smaller than the average voltage drop between the segments, then it is certain that some of the coils is short circuited out.

2—An original method used for discharging batteries was recently inspected in the shop of an electrical repair man which works well and because of layout much time is saved as the apparatus is always within the reach of the operator.

A light frame work is made of 1 by 2 in. wood strips, of the size shown in the illustration, Fig. 5. The frame work is made of two sections, held apart a distance of 6 in. Between the opposite strips of the frame, 1/8-in. iron rods are placed. These are spaced about 1 1/2 in. apart. This provides a suitable frame work on which the iron resistance wire may be wound, with perfect safety, because each rod is thoroughly insulated from the others. Also, any heat generated by the discharge of the batteries will not produce any fire hazard, because there is sufficient air space between the wire and the wood of the frame.

The two rows of wire rods, the top one being 10 in. above the lower one, gives the basis for winding the wire net work. Beginning with one rod at the bottom corner an iron wire is secured to it, and then wound around the rod immediately above, from whence it leads to the rod below and adjacent to the first rod. It is not necessary to wind the wire around every rod, because connections are made only to every fourth rod at the bottom of the frame. On these the wire should be wound around once

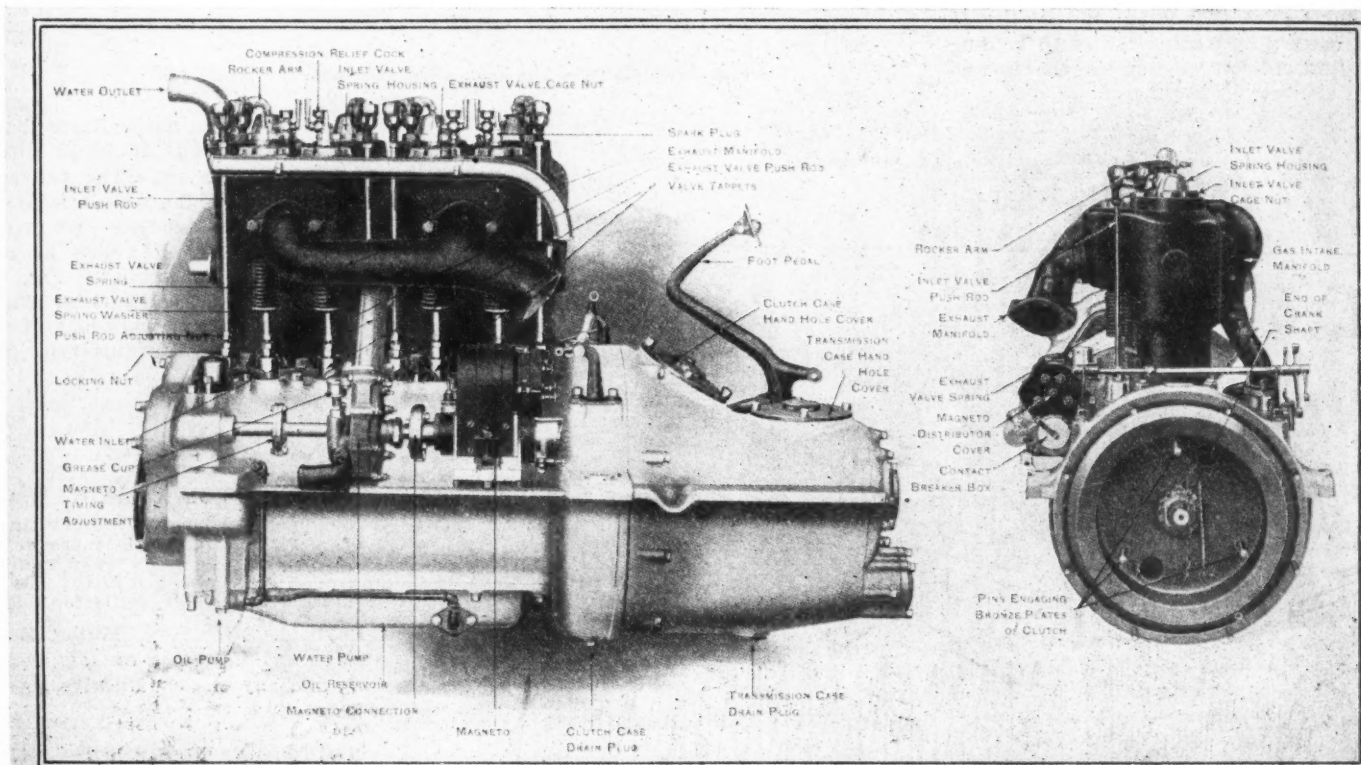


Fig. 3—Illustration of the Chalmers 1912 engine for the purpose of installing lighting generator by cutting the auxiliary drive shaft and applying the proper fittings for the generator shaft connection this installation can be made

or twice before being led to the next rod above.

This frame is set above the test bench as shown. Three groups of "plug in" contacts are made in the lower part of the board. Each group has three plugs. This gives nine contacts, each one leading to a different and equidistant point on the length of wire. Convenient connections to these positions on the frame can be made by making a terminal connection on the end of the iron rod which the wire is wound around. These connections are led directly to the plug in contacts in the board.

It is necessary to make a number of connecting cords which are led to the board from the battery. Every battery shop should have a number of short connecting cords with clips on the end to connect the batteries in series.

With this rig, one or several batteries can be discharged at the same time. If one battery is to be discharged, a cord is run from terminal of the battery to the plug in contacts in the board. If the discharge is too rapid, the core should be attached to adjacent holes; if the discharge is not to be so rapid, then of course, the discharge rate is going to depend directly on the size and amount of iron wire used in the frame. If No. 14 iron wire is used, the discharge will be about 80 amp. when one volt battery is connected to adjacent contacts on the board. If the cores are connected to contacts 1 and 3 then the discharge rate will be about 40 amperes, or if 1 and 4 the rate will be about 25 amperes.

3—Yes, but we advise you to split the batteries in two sections of 16 volts each so the starting motor will not be excessively strained. This can be easily done by taking off the center tap of the 32 volt battery by cutting the strap holding the first 16-volt section to the second

16-volt section. Then by connecting the positive of one group to the positive of the second group, and the two negatives likewise, you will have a 16-volt battery that can be used in connection with the starter.

4—Yes, by incorporating a switch in the field circuit of the motor that will reverse the flow of current through the field only. The motor will not reverse by reversing the connections to the motor. This will reverse the flow of current through the motor, true, but the

relation between the poles of the motor with regard to polarity will still be the same and the direction will not be reversed.

5—See last week's issue of MOTOR AGE which showed the arrangement of the electrical end of the Ideal service station.

WESTINGHOUSE WIRING

Q—Publish wiring diagram of the 1915 Briggs-Detroit Model C. touring car equipped with Westinghouse starting, lighting and ignition system.—Robert L. Behre, Daly City, Calif.

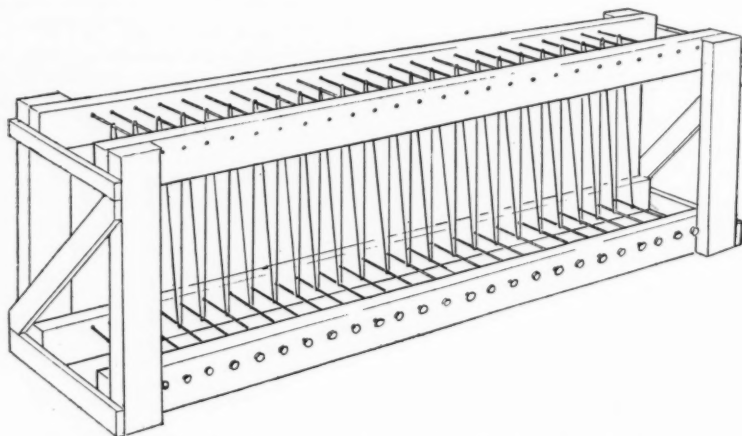
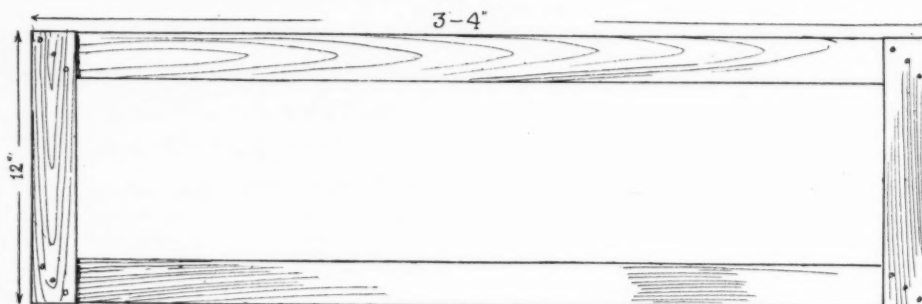


Fig. 5—Details of the frame for the battery discharger

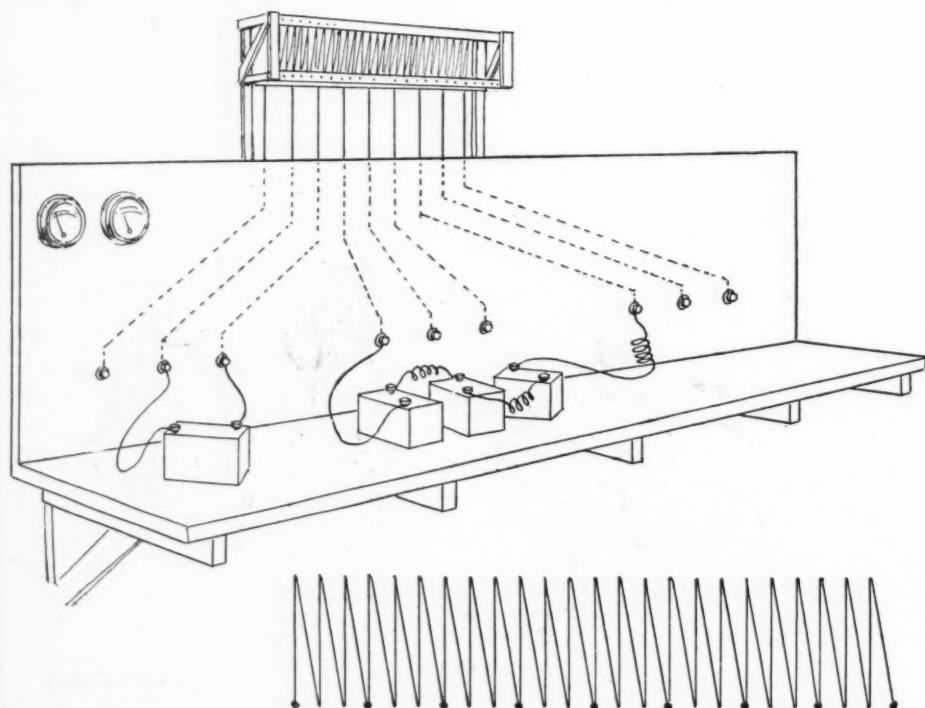


Fig. 4—Showing the use of the battery discharging outfit as described and illustrated above

Our specifications do not indicate that the Briggs-Detroit was equipped with the Westinghouse system. The car as we have it listed used the Auto-Lite system on most of the models. We are, therefore, considerably at a loss as to just what diagram to publish. Fig. 6 shows the standard Westinghouse diagram which is used on all cars using the Westinghouse system with this type of apparatus.

Carburetion

CARBURETER FOR CHANDLER

Q—A Rayfield carburetor is now installed on a 1917 Chandler, is there any improvement here, if so what make would you suggest or what changes in the Rayfield?—Thomas Hofmeister, Fullerton, Md.

The Rayfield, Stromberg, Miller, Zenith, Master and Columbia are all used for racing and any one should give good results.

SETTING CARBURETER

Q—How do you set the carburetor on a 6-39 Auburn?

2—How should it be cleaned?—Clifford McDowell, Cozard, Neb.

1—The carbureter used on this model Auburn is shown in Fig. 7. It is the Rayfield model M, and all Rayfield carbureters are adjusted for more gasoline by turning the needle valves to the right. There are three adjustments on this carbureter, although two of them only serve to increase or decrease the density of the mixture. The low speed adjustment should be set first. To do this be sure that the engine has run sufficiently long to thoroughly heat all parts. Turn the spark and shut the throttle down so the engine idles nicely. The low speed adjustment should be turned until the engine slows down perceptibly, and until the exhaust fumes lose that heavy pungent odor characteristic of gasoline burned with an insufficient amount of air. Then turn the low speed adjustment to the right until the engine speeds up slightly. If at this setting the engine does not turn over slow enough, with the gasoline and spark levers set at their reduced position, use a small screwdriver and turn the screw A to the left which will allow the butterfly valve to close tighter.

Now advance the spark about two-thirds of the way. Then grasp the throttle connection to the carbureter and open the throttle valve very suddenly. If the engine sputters and coughs as it accelerates then it is a sign that the high speed nozzle is under supplied. Turn the screw to the right which will increase the amount of fuel fed to this nozzle. This screw is just inside the air intake opening. It is possible that you will find this screw soldered tight because the factory deemed the high speed adjustment sufficient to take of all ordinary conditions.

QUERRY ON ALLEN CAR

Q—During what year was the Allen car, model 324-M made?—F. A. Davis, McKeesport, Penna.

This car was made in 1915.

Engine Maintenance

REBORING CYLINDERS

Q—Will the reboring of one cylinder on a four-cylinder Buick, model C-25, and equipping it with an overside piston throw the engine out of balance enough to cause it to run unsatisfactorily?—A. D. Gise Motor Co., Coffeyville, Kansas.

It is bad practice to rebore only one cylinder and fit an oversize piston to that one. Yes, it will throw it out of balance and the engine cannot run without undue vibration.

QUESTIONS ON CHEVROLET

Q—What is the address of the manufacturer of the new Duesenberg eight-cylinder racing car?

2—What is the address of the Chevrolet Company?

3—What causes a Chevrolet 490-1917 model to backfire when the spark is fully retarded?

4—Instruct how to remove the play from the steering gear?

5—How many miles to the quart can a Chevrolet 490 travel?

6—What is the bore and stroke of the Chevrolet 490, 1917?—Bryan Redinus, Ashkum, Ill.

The Duesenberg products are being

manufactured by the Rochester Motors Co., Rochester, N. Y.

2—Chevrolet Motor Co., 1764 Broadway, New York City.

3—It is a common characteristic of engines to backfire with late ignition. This is caused by the ignition occurring before the intake valve is completely closed.

4—There are two adjustments on this gear. The worm shaft adjustment is located at the top of the steering gear housing and at the base of the steering tube. To take up the end play in the worm shaft, loosen the lock nut and screw down the adjusting nut until all of the end play is removed. After this adjustment has been made tighten the lock nut. To adjust the worm wheel for end play tighten the worm wheel thrust screw located on the engine side of the steering housing on a line with the steering cross shaft. When making these adjustments it is best to have both front wheels raised from the ground as it will help determine if the adjustment is correct.

5—This model will run about five miles to the quart under normal operating conditions.

6—This model is 3 11/16 by 5 in.

ENGINE TROUBLE CHART

Q—Publish an Allen engine trouble chart similar to that one published of the "T" head type in the November 6 issue.—Fred A Cross, St. Louis, Mo.

The trouble chart recently published will fit the demands for any engine. The reason that we chose the T head type for illustration was that both the intake and exhaust valves would be visible. If you will note, the parts in the T head engine illustration are almost identical with the parts in the Allen L-head engine, except for the camshaft tappets, which in your case are of the mushroom type.

CHANDLER VALVE TIMING

Q—What is the valve timing of the 1917 Chandler?

2—Would you advise a different timing for this engine to get more power and speed?

3—For continued high speed work what kind of connecting rod bearings would you recommend, also main bearings?

4—Would you consider it better to use Burd high compression rings in preference to stepped cut rings for higher compression?

5—As to compression, would 90 pounds be too much or could I have more? How much higher should I allow the pistons to go up in the cylinder to get the most compression, that is up to the right pressure, whether it be 90 or no?—Thomas Hofmeister, Fullerton, Md.

1—The valve timing is as follows:
Exhaust closes 10 degrees late.
Intake opens 15 degrees late.
Exhaust opens 50 degrees early.
Intake closes 40 degrees late.

2—You might advance the valve timing about 5 deg. or perhaps one tooth on the timing gears. Remove the front cover over the chain compartment, exposing the timing sprockets and chains. The punch marks on both sprockets will line up with

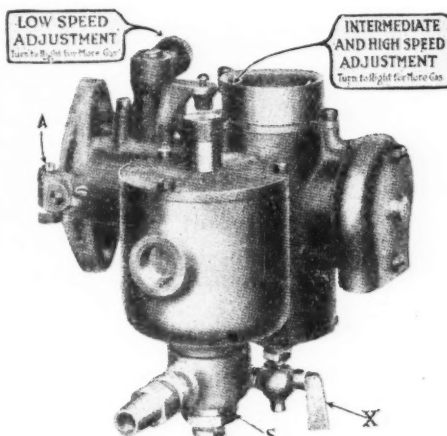


Fig. 7—Rayfield carburetor used on a 1916 Auburn 6-39

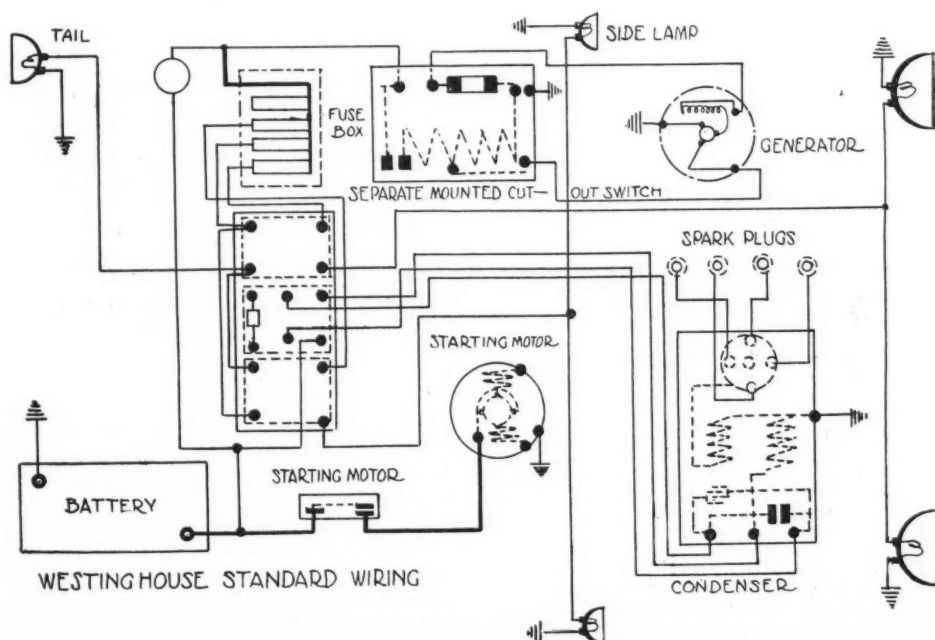


Fig. 6—Westinghouse system used on the 1915 Briggs Detroit, Model C

the sprocket centers when the timing is regular. The two points in question will be found on the sprockets nearest one another.

3—You now have bronze bearings and to eliminate heat it would be well to have bearings with babbitt linings, but you will have to have these made to order.

4—No, well fitting rings as ordinarily used in the Chandler will serve.

5—Ninety lb. will be all that is necessary. We would not advise use of plates on the pistons. It will be better to mill off perhaps 1/16 in. from the base of the block and then try this, although it will make a little extra work. If this does not give enough take off a little more and so on.

VALVE SETTING ON NATIONAL

Q—Publish diagram for valve setting of National 1914 V series engine for road work and also for race work.

2—What speed should this car develop stripped with 17 tooth pinion and 45 tooth gear or 3 11.17 ratio?

3—What is best speed ever obtained with this engine without material change?

4—How many revolutions per minute will it make?

5—Give horsepower curve.

6—Are there any slight changes that could be made to make it any faster? I have made 75 m.p.h. with 14-45 gears.

7—Would a Stewart vacuum system supply it with gas enough through a 1/4-in. pipe when at top speed?

8—Should spark be advanced any from regular setting? It is equipped with Bosch Dual Duplex ignition.—P. B. Rice, Rice's Garage, Dublin, Ga.

1—The only available valve timing for this engine, as furnished by the National company, is shown in Fig. 9. The valve timing of the Essex, known to be fast and to correspond closely with racing engines, has the inlet open 7 deg. late and close 42 deg. late; the exhaust opens 55 deg. early and closes 8 deg. late. By comparison it will be seen this corresponds closely with the National timing.

2—The fastest efficient speed of this engine is around 1800 r.p.m., although it will turn over more than 1900 r.p.m. From this you will be able to figure just what can be done in the matter of speed with different gear ratios and tire sizes; in other words, you can work out a combination of tire and gears that will permit the engine to turn up 1800 r.p.m. and thus give highest efficiency.

3—The National company stopped racing two years prior to the 1914 car and so has no records of what the 1914 engine was capable of doing. In a light car there is the possibility of getting between 80 and 85 m.p.h.

4—This is answered in No. 2.

5—This is shown in Fig. —.

6—We doubt it, outside of working out a gear ratio and having the engine in as nearly perfect working condition as possible. It might be well to install a modern carburetor to take care of the relatively poor gasoline.

7—For extreme speed a tank with pressure feed will furnish a better supply of gasoline to the carburetor. This can be rigged as on racing cars, with a hand pump, to supply the air pressure. You can have a mechanical pump, as

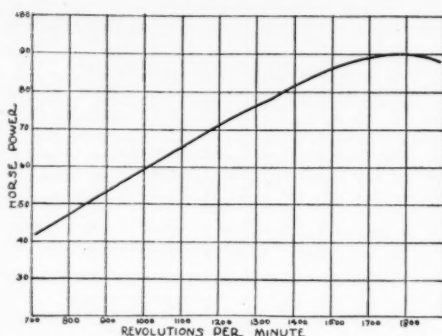


Fig. 8—Horsepower curve of 1914 National

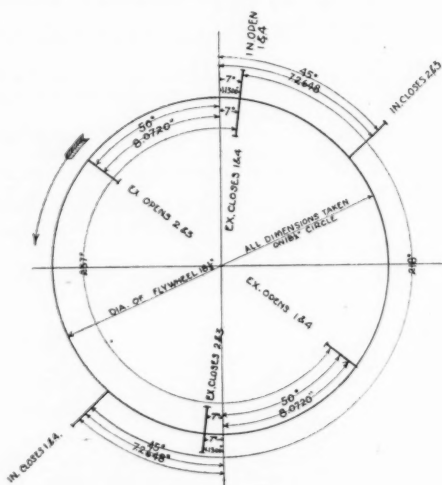


Fig. 9—Valve timing diagram for 1914 National

fitted on the Cadillac, for ordinary running.

8—It is safe to say that, considering the experience in making racing cars, the National company has placed the ignition timing about where it belongs and it would not be wise to alter this materially. You might try advancing it a little providing you will be willing to sacrifice flexibility on the road. For racing purposes the National company used a larger intake manifold and a Splitdorf double ignition instead of the Bosch magneto. You can undoubtedly procure from the National company a manifold such as mentioned.

Miscellaneous

RECOUNTS PECULIAR EXPERIENCE

A peculiar incident happened to me not long ago. I was motoring from one town to another in the Arctic weather we of Manitoba and Saskatchewan are experiencing just now, and herewith is recorded the phenomenon. I use this word advisedly for I cannot completely understand the occurrence nor can the garage men I know. We were using a Chevrolet car and bucking snowdrifts. Central Butte, Sask., was 22 miles from Mortlach. About one mile from Central Butte we stalled in a snow drift trying to crawl around a Buick and a Ford which were stuck in the snow drift on the road. After helping dig the other two out and seeing them started, they had helped us dig a path to fairly decent footing. We tried to start. The self-starter had quit. We looked around and located our trouble in a missing battery. After walking into town and having the Chevrolet towed in

we started out to find the battery. It was found 1 1/2 miles from the drift we were stalled in back along the road we had come. Please explain this to me if possible, as my friends will not believe me nor my companion, a salesman with a reputation for veracity, except when he is talking his own line; but all jokes aside, HOW DID IT HAPPEN?—C. Whitney, Dill River Heights, Winnipeg, Man.

This is a good questions, and it is worth a good answer, but how to account for the engine's performance without a source of current for its ignition supply we do not know. The writer once drove a car about three blocks with the ignition shut off. The engine continued to rum simply because it was so hot that the mixture in the cylinders burned and caught fire by the heat of the compression and the high temperature of the engine. Just whether this was the case with your car we cannot say, but a good possibility is presented here.

IMPROPERLY FITTED GEARS

Q—What firm manufactures The Woods Disc Pinch Clutch Starter for Ford cars? Where can parts be secured for same?

2—There is a pronounced knock in a Saxon Six, it sounds just like a loose connecting rod bearing but on taking the engine down we found that all bearings were O. K. New camshaft bearings were installed, piston pins and piston alignment were checked up and were found O. K. There was no end play in crankshaft, flywheel and clutch assembly. We then checked timing gears for burs, they were all right but loose on pitch line. We installed new timing gears and found that our knock ceased. We came to the conclusion that the gears had been machined wrong but that seems funny as the knock only occurred when the engine was speeded up. What is your opinion of the cause?—J. Paul Martin, Automotive Repair Co., Wilkesburg, Pa.

1—We have no information on this starter for Fords.

2—The fact that the timing gears had considerable lost motion between the teeth, indicates that the gears were not very carefully fitted. It is noticed that at first you thought this trouble was loose connecting rod, which indicates that the knock was occurring at crankshaft speed. If the crankshaft drive gear of the timing combination was eccentric in shape or had a few teeth undersized, which is very often the case, when the first few gears come off from an automatic gear hobber, then the knock would be caused by this gear. We are not inclined to believe, judging from your description, that there was any trouble being occasioned by the camshaft gear.

DRAG LINK ADJUSTMENT

Q—Give size and method of adjustment of drag link used on all American made cars.—L. J. Duplant, Auto Repair and Supply, Titusville, Pa.

The adjustment of a drag link is, to all intents and purposes, the same on one car as another except that one may be given a little more toe-in than another. This is something that is not as a rule sought and probably no factory states it in instruction books. Generally speaking the front wheels will be 1/4 in. closer together in front than in the rear. This is a safe figure, but sometimes it will run as high as 3/8 in. Anywhere

from 3/16 to 3/8 in. will do, and a happy medium, as has been found, is 1/4 in. Beyond this Motor Age has no specific data on the subject inasmuch as it is not needed.

CLUTCH FOR CYCLECAR

Q—Which would be best, a cone or disk clutch, to be used on cyclecar?

2—Give address of a motor-cycle supply company.—Fred Harlin, Itasca, Texas.

1—Either will do, but the cone will be lighter and being of a more simple nature probably will be best suited for this purpose. Cyclecar companies are no more, but if you will write the Woods Mobilette Co., Harvey, Ill., we think it would be possible to secure both transmission and clutch,—as well as other parts,—which will suit your needs.

2—Any automobile supply house in Kansas City, St. Louis or Chicago handles motorcycle supplies.

TAKING CARE OF TIRES IN WINTER

Q—How should tires be taken care of in winter when car is not in a heated garage?

2—When tires are taken off should they be inflated or not?—A. M. Schmitz, 8521 Vulcan St., St. Louis, Mo.

1—If you are not going to use the car, remove the tires, take them into a cool, but not cold room, wrap them in gunny-sack or heavy paper and hang them so they will not be creased in any way. The tubes should be left in the casings and very slightly inflated; this will maintain the shape of both the tubes and casings. Only enough pressure should be used to shape the casings. Then when they are wrapped they will be held in good shape. Have them clean when put away, and do not leave any trace of oil or grease on them.

2—See above.

OVERSIZED TIRES AND CAR SPEED

Q—Does the putting on of oversize tires reduce the speed of a car?

2—Does the putting on of oversize tires reduce the power?—Reader, Dillon, Mont.

1—No; with the same number of engine revolutions it will increase the speed of the car. It has the same effect as increasing the gear ratio.

2—Yes; that is, it does because the gear ratio is raised. You would have poorer results in climbing hills or going through mud. Once under way, however, on a good road you would be able to get more speed and a little better economy. The difference one way or another, however, is so slight on a single over-size as not to be worth considering.

Rebuilding

WANTS A FORD RACER

Q—What is the price of any reliable steering gear for a Ford that is to be driven very fast? Where can it be secured?

2—Where can a 2 3/4 to 1 ring gear?

3—Would a rebuilt Ford traveling around 80 m.p.h. be considered safe without bolted on tires? If not, where can wheels and tires of this sort be secured?

4—What is the price of the Goodyear cord tires for Fords? Of Oldfield tires?

5—How many speeds do race cars have?

6—What is the weight of a Ford touring car?—Herman Meyers, East Moline, Ill.

1—The Maxwell steering outfit is of the type that can be made to work on a Ford and probably you will be able to secure a used one at some of the car wreckers advertising in Motor Age. Otherwise you can buy such an outfit from a Maxwell dealer.

2—Any gear maker can furnish this combination and several advertising in Motor Age announce such things carried in stock.

3—No, nor with any kind of tires. This speed calls for the straightest and best sort of road and then it will be difficult to hold the car steadily. The makers of wire wheels can furnish lugs that will prevent much chance of throwing a tire.

4—The Goodyear 30 by 3 1/2 in. non-skid cord lists at \$26.45 and the same size plain tread at \$24.65. The Oldfield list is close to these figures.

5—Usually three forward, although some of the earlier models of racing cars had four speeds.

6—About 1500 lbs.

CAB FOR TRUCK

Q—Publish a sketch and a short description regarding the building of an inexpensive cab for a 1 1/2-ton Republic truck, this year's model.—Merrill Prober, Carpenter, Ia.

A design which probably will meet your needs will be found in Fig. 11. If you are handy with tools you can prob-

ably construct a fairly serviceable top; otherwise it will be better to go to a carriage builder to have the work done. It will call for a substantial foundation in the way of sills which can be bolted to the chassis frame and from these sills, made to fit the width of the frame and as long as desired, build up the superstructure. The back uprights should be at least 2 by 3 in. and the front ones can be a little lighter. This is necessary to withstand the racking the top will receive in truck work. From the back to the front uprights the cross member can be sawed out of a fairly heavy piece and shape shown in the illustration. All of the uprights should be of oak, well screwed together and also use iron braces wherever possible. Cross braces will also be necessary, particularly in the back. The top can be covered with any light wood, over which canvas, painted several coats, can be spread, held in place by moulding strips on the top of the sides and so bent as to follow the contour of the top. Build in over the cowl and fit an adjustable windshield. The sides can also be covered with light matched material, which can be painted. There should be a window in the back, one on either side and also a drop window in each door. When making these windows fit in frames between the studs so that you will have something to attach the window frames to. It will be better to have the glass so arranged as to drop inside the paneling.

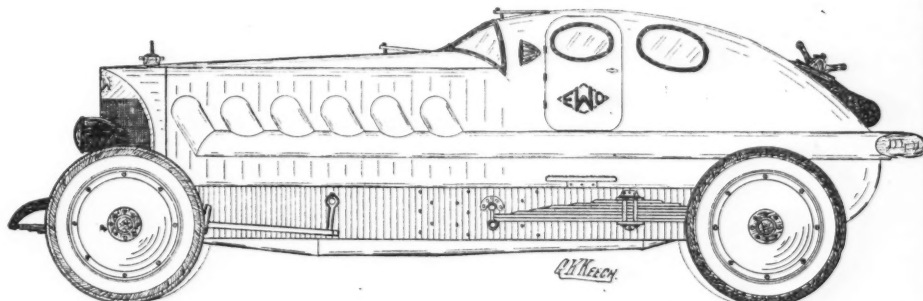


Fig. 10—Unusual body design submitted by a Motor Age reader from West Virginia

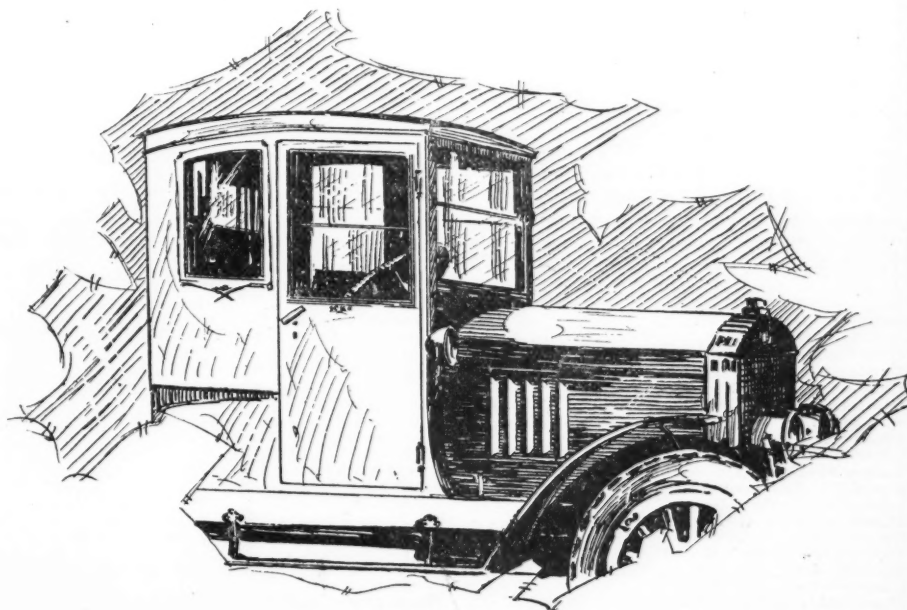
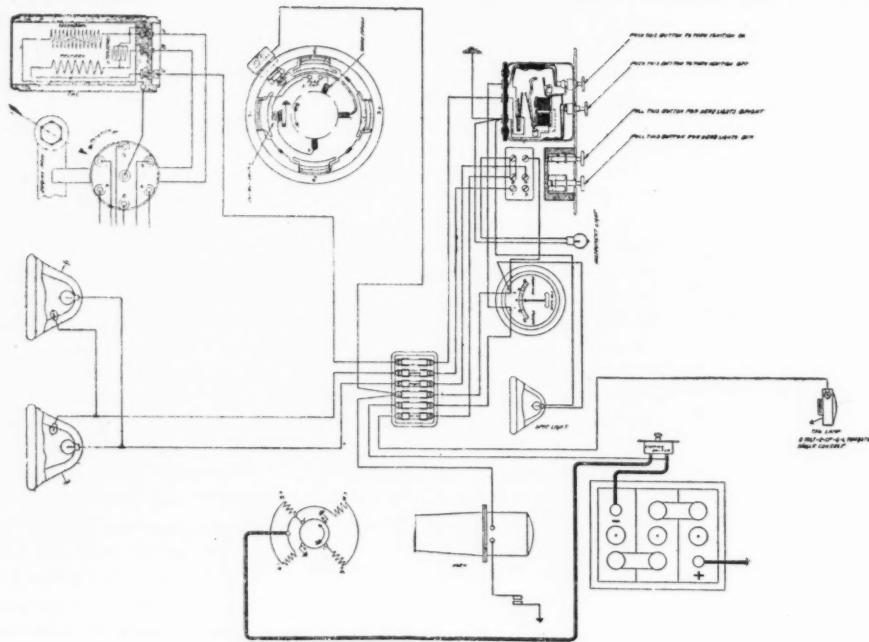
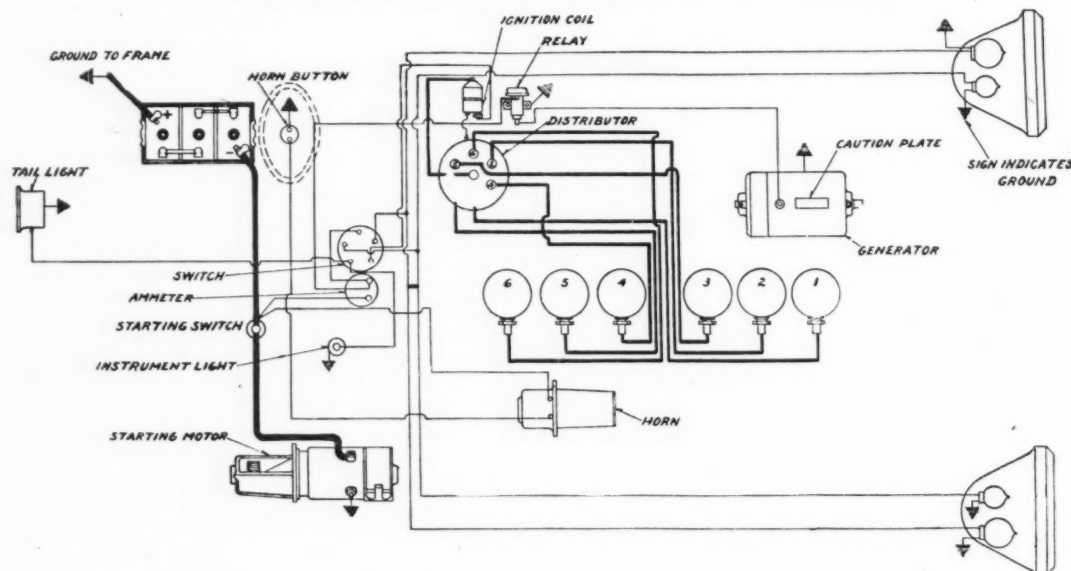


Fig. 11—Cab layout for truck

Motor Age Weekly Wiring Chart No. 58



Westinghouse starting, lighting and ignition on 1919 Lexington



1919 Liberty Six with Wagner starting, lighting and ignition system

THIS WEEK

1919 Lexington
1919 Liberty

Abbott—March 20-27, '19
Aleo—April 24, '19
Allen—Dec. 18, '19
Alter—Nov. 14, '18
Apperson—March 6, '19
Auburn—Nov. 27, '19
Briscoe—Oct. 16, '19
Buick—Nov. 21, '18; April 3, '19; Oct. 23, '19
Cadillac—Dec. 19, '18
Cartercar—May 1, '19
Case—Oct. 2, '19
Chalmers—Feb. 20, '19; March 27, '19; Nov. 27, '19
Chandler—April 3, '19
Chevrolet—Nov. 28, '18; March 27, '19
Cole—Jan. 23, '19; April 3, '19
Crov-Elkhart—June 26, '19
Cutting—Nov. 6, '19
Daniels—Dec. 4, '19
Davis—May 8, '19; Dec. 4, '19
Detroit—March 6, '19
Dodge—Dec. 12, '18
Dorris—Dec. 11, '19
Dort—March 13, '19

Elgin—Feb. 27, '19
Empire—March 13, '19; Oct. 30, '19
Essex—Oct. 23, '19
Ford—Jan. 30, '19; Feb. 6, '19; May 15, '19
Franklin—June 19, '19; Dec. 11, '19
General Battery Charging—May 20, '19; Sept. 25, '19
General Magneto Diagram—June 5, '19
Grant—Feb. 27, '19; March 27, '19
Haynes—Sept. 4, '19; Oct. 9, '19
Henderson—April 3, '19
Hudson—Dec. 5, '18; May 1, '19
Hupmobile—Feb. 13, '19; Oct. 16, '19
Internal Connections—July 10-17-24, '19
Interstate—March 13, '19
Keeton—Nov. 6, '19
King—July 3, '19
Kissel—July 3, '19
Krit—Feb. 6, '19
Lexington—April 24, '19
Little—March 20, '19
Locomobile—Jan. 23, '19; April 17, '19
Marmon—Jan. 9, '19; Dec. 25, '19
Maxwell—Jan. 16, '19; Aug. 14, '19
Marion—March 6-20, '19
Merced—Jan. 23, '19; Aug. 28, '19; Nov. 27, '19
Michigan—March 20, '19

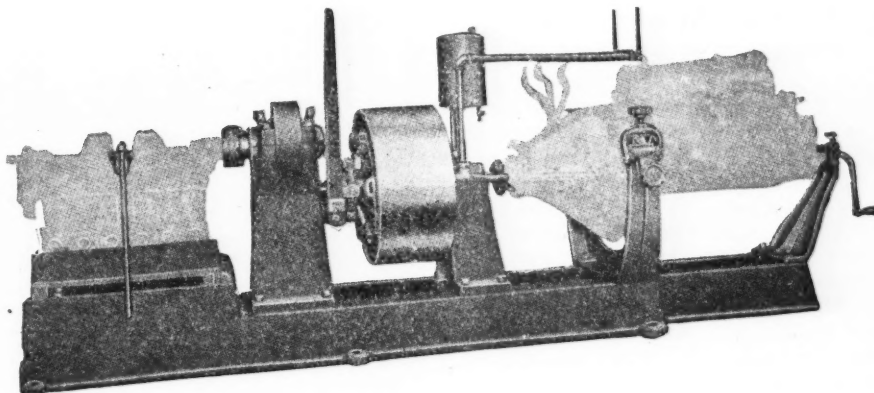
Mitchell—Jan. 9, '19
Monroe—Oct. 30, '19
Murray—May 1, '19
National—June 10, '19
Oakland—Jan. 2, '19; Oct. 16, '19
Oldsmobile—Jan. 23, '19
Overland—Nov. 7-14, '18
Owen—Magnetic—Sept. 8, '19
Packard—June 19, '19; July 31, '19
Paige—July 3, '19
Paterson—March 20, '19; June 26, '19; July 9, '19
Pierce-Arrow—Oct. 2, '19
Premier—April 10, '19; Dec. 18, '19
Pullman—April 10, '19
Regal—Feb. 6, '19; April 10, '19
Reo—Feb. 27, '19; Aug. 21, '19; Oct. 9, '19; Nov. 13, '19
Saxon—April 17, '19
Scripps-Booth—Dec. 26, '18
Simplex—April 17, '19
Stanley—June 26, '19
Stearns-Knight—April 24, '19
Studebaker—Dec. 26, '18; Dec. 25, '19
Stutz—Jan. 23, '19
Velle—April 24, '19; Sept. 25, '19
Westcott—May 8, '19
White—Sept. 25, '19
Special Systems for Fords—May 15-22, '19

Service Equipment

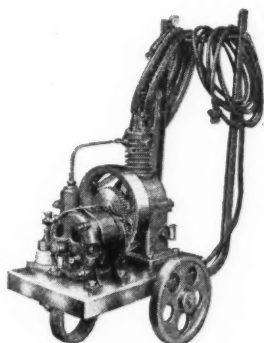
Time Savers of the Shop

Burning-In Stand

The Miles Mfg. Company, Newton, Iowa, is making a running and burning-in stand for Ford and Fordson tractor engines. It is very easy to change this stand over from one engine to the other, four extra pieces being all that is necessary for the conversion. Back gears are incorporated in the drive housing and these are so geared that the burning-in speed is one-half of the pulley speed. For the burning-in operation the engine is placed in an inverted position, which makes it easy to adjust and inspect the bearings during the burning-in period.



Burning-in stand for Ford and Fordson engines



Curtiss compressor outfit

Curtiss Compressor Outfit

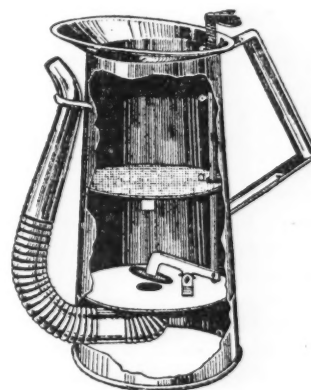
To meet an insistent demand for a small portable outfit for direct pumping of air, free from oil, the Curtis Pneumatic Machinery Co. of St. Louis has perfected and just placed on the market their new style "Y" $\frac{1}{4}$ hp. outfit, especially designed for private garages or small public garages and filling stations. This outfit should not be confused with little makeshift "pumps." The style "Y" outfit has the controlled splash oiling system and other features—can be furnished either portable or stationary—and comes geared only. This outfit is not intended for continuous duty or pumping into a tank, as it is a special purpose machine—convenient and inexpensive. Upon re-

quest prices and full particulars will be furnished by the Curtis Pneumatic Machinery Co., St. Louis, Mo.

All-in-One Oil Measure

This is an extremely handy oil measuring can and because of its patented features it is possible to pour the oil into the engine without spilling a drop, and it is not necessary to tip or incline the can in order to pour the oil. This oil can has a flexible spout, the nozzle of which is inserted in the oil filling plug of the engine, then by pressing the small lever at the top of the can with the thumb the oil is released and flows to the engine. The illustration shows clearly how the can operates. It can be had in one size only, for $\frac{1}{2}$ gal. and with a coppered or enameled finish. The price is \$3.50 made by the Brookins Mfg. Co., Inc., Dayton, Ohio.

are the contact points and these are subject to very little wear if the operator maintains the correct adjustment. While the six volt battery charger does not serve as a permanent installation in a garage simply because of its size it is a very convenient rectifier to have because it can be set on the running board of the car and the batteries charged over night. The illustration shows the small type and the largest made by the Fore Electrical Mfg. Co., 5811 Easton Ave., St. Louis, Mo.



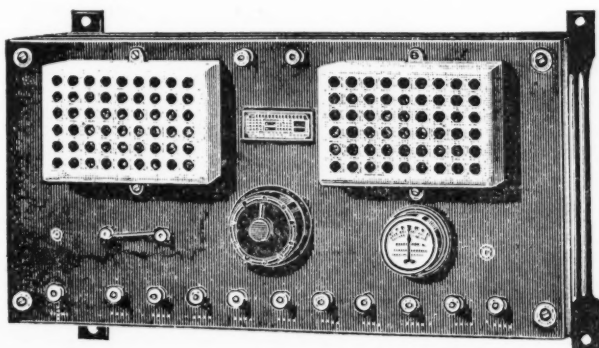
All-In-One oil measure

Fore Rectifiers

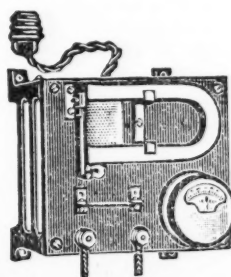
The Fore rectifier made in the number of different sizes to handle anywhere from one to 6-volt battery to ten 6-volt batteries. These rectifiers are of the vibrating type which type is very efficient and economical of operation. The wearing parts on a rectifier of this type

Piston and Bearing Tool

This piston rod aligning tool takes up the alignment of old connecting rods and helps to accurately set the bearing to the rod. The crank end of the rod is held in position by being placed over a mandrel. The mandrel is held with set screws at the lower end of the tool. The upper end of the gage is to proper alignment and by use of a square the bottom edge of the piston can be checked up. The gage is supplied with an arbor and a special size cleave for \$27. This gage is made by John Peyer, 301 West Sixty-eighth street, New York.



Showing the small and largest type Fore rectifier

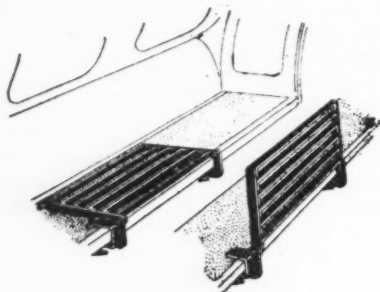


The Accessory Corner

New Fitments for the Car

Tri-Co Windshield Cleaner

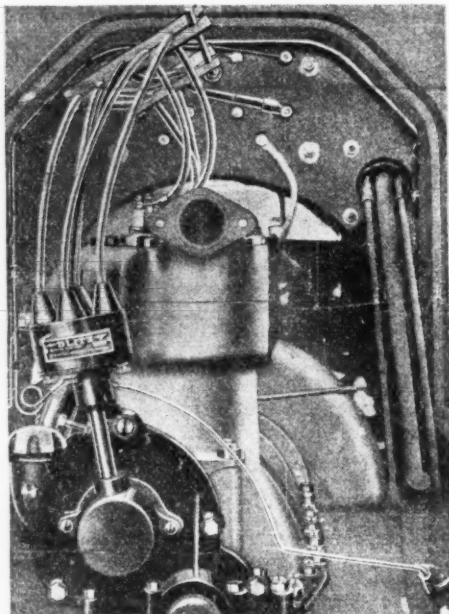
This is a squeegee secured to the windshield and held in position by the special clamping device in the space between the upper and lower glass. It is simply attached, as the illustrations show. The windshield is opened, the cleaner attached to the upper glass, and the shield is then closed. The two arms with the multiple gum rubber strips make contact with every portion of the glass. Celluloid rivet heads are used so that the glass will not be scratched. A small handle protrudes to the inside of the glass where it is within easy reach of the driver or passenger in the front seat. Made by the Tri-Continental Corporation, Buffalo, N. Y.



Standley running board tread in two positions

Universal Radiator Shutter

The Universal Radiator Shutter, made by the Auto Metal Parts Co., Des Moines, Iowa, is attached to the front of the radiator and by means of a dash control the shutters are opened or closed to control the amount of air flowing through the radiator. The shutter is made of metal and enameled black to harmonize with the rest of the finish. For cold weather a shutter of this type serves an ideal purpose in maintaining efficient engine temperatures. At present the production is for Ford, Maxwell, Chevrolet, Dodge, Buick, Saxon, Reo, Studebaker, Chalmers, Nash, Hupmobile, Cadillac and Chandler; the prices for these various models ranges from \$11.50 to \$38.95.



Blitz ignition system for Fords

The sales department of the Auto Metal Parts Co. is located in Chicago—624 Michigan Avenue.

Blitz Ford Ignition System

This is an ignition system for the Ford car which handles the alternating current from the Ford magneto as well as from a battery and through its combined timer, synchronizer and distributor the current is lead directly to the spark plugs. The system is very easy to install, requiring only that the front of the timing gear housing be removed and the new housing fitted in place. Made by the Afordalock Co., 729-31 West Broadway, Council Bluffs, Iowa.

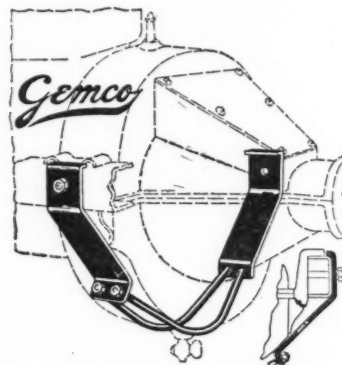
Gemco Crankcase Support

The crankcase support shown in the illustration when applied to a Ford with a broken crankcase arm takes the place of the broken arm and can be installed in about 15 min., it is said. This support arm relieves each crankcase arm on the side of the engine of its strain and, consequently, should either

or both of these arms break the support will hold the engine in place. The device is made by the Gemco Mfg. Co., Milwaukee, Wis., and lists at \$2.50.

Standley Running Board Tread

This is a safety tread for the running board of a car. It is easily attached to the running board with its portable clamps, and because of its construction it can be raised from the running board without loosening the clamps thus permitting the running boards to be cleaned underneath the tread. The tread is made of durable sheet metal and is black baked Japan finished. Made by the Standley Skid Chain Co., Boone, Iowa.



Gemco crankcase support

THE AUTO SPARK LITE

The Auto Spark Lite, described in MOTOR AGE, Nov. 27, is made by the J. C. McAdams Sales Co., 51 East 42nd St., New York.



Universal radiator shutter



Tri-Co windshield cleaner

Tire and Rim Sizes

Motor Maintenance Data Cost Sheet No. 69

One of a series of weekly pages of information valuable to service men and dealer—Save this page

1916 Cars (Continued)

CAR AND MODEL	Make of Tire	Size of Tire	Style of Bead	Type of Rim	Make of Rim
Cadillac, 53	Goodrich	36x4½	S. S.	Dem. S. S.	Kelsey
Cameron	U. S.	32x4		S. S.	Goodyear
Case, T-40	Goodyear	34x4		Demountable	Kelsey
Chalmers, 32		34x4	S. S.	Demountable	Firestone
Chandler, 17	Goodyear	34x4	Plain & Non-skid	S. S.	
	Goodrich				
Chevrolet, H-4 and H-2		32x3½		S. S.	Detroit
Chevrolet, 4-90		30x3½		S. S.	Detroit
Cole, 860		34x4	Clincher	Q. D.	
Crow-Elkhart, 30		32x3½		S. S.	Firestone
Cunningham, V-1	Opt.	37x5	Q. D.	Q. D.	Firestone
		35x5			
Daniels, A & B	Goodyear	32x4½	Cord	S. S.	Firestone
		34x4½			
Davis, 6-F		34x4		S. S.	Firestone
Davis, 6-E		34x4½		Q. D.	Firestone
Detroit, F		33x4		S. S.	Kelsey
Dispatch, G		36x3½		Q. D. R.	Universal
Dodge Brothers	U. S.	32x3½	S. S.	S. S.	Stanweld
	Goodyear	33x4			
	Goodrich				
Dorris, I-B-6	Goodyear	36x4½	S. S.	Q. D. D.	Firestone
	Firestone				
Dort, 5-A	Goodyear	30x3½	Clincher	Demountable	Detroit
Elcar	Firestone	32x3½	S. S.	No. 21	Stanweld
Empire, 60		34x4		S. S.	Firestone
Empire, 45		33x4		S. S.	Stanweld
Enger		32x4		S. S.	Firestone
Farmack		33x4			
Fiat, 55 & 56		37x5			Firestone
Ford-T		30x3½	Clincher	Clincher	Ford
Franklin, Series	Goodyear	32x4	S. S.	No Rim Cut	Goodyear
				Detachable	
F. R. P.		36x5		Q. D. C.	Wire Rudge
Glide, 6-40	Goodyear	34x4	S. S.	Demountable	Goodyear
Grant, V		32x3½		S. S.	Firestone
Halladay, R-2		34x4		S. S.	
Harvard, 4-20		28x3			
Haynes, 34 & 35	U. S.				
	Firestone	34x4	S. S.	S. S.	Goodyear
	Goodyear				
Herff-Brooks, 4-35		33x4		S. S.	
Herff-Brooks, H-6-50		34x4		S. S.	
		34x4			
Hudson, 6-40		34x4½			Kelsey
		32x4½			
Hupmobile, N	Goodyear	34x4	S. S.	Demountable	Kelsey
Inter-State, T & TR		33x4		S. S.	Firestone
Jackson, 68		34x4½		Q. D. R.	Firestone
Jackson, 34 & 3-48		32x4		S. S.	
Jeffery, 661	Goodyear	35x4½		S. S. Dem.	Stanweld
Jeffery, 462-472	Goodyear	34x4		S. S. Dem.	Stanweld
Jordan, B	Firestone	35x4½	S. S.	E	Firestone
King, E	Goodyear	33x4		Demountable	Stanweld
	Firestone				
Kissel Kar, 6-42		34x4		S. S.	Stanweld
Kissel Kar, 4-32		33x4		S. S.	Stanweld
Klinekar, 6-36-E	Goodyear	34x4	S. S.	E. light	Firestone
Lenox, D & O		34x4½		Q. D. C.	Firestone
Lexington, 6-N	Goodyear	34x4½	S. S.	Dem. Type A	Goodyear
Liberty, 10-A	Opt.	32x4	S. S.	Demountable	Firestone

ABBREVIATIONS:

S. S.—Straight Side. Q. D. C.—Quick Demountable Clincher. Dem.—Demountable. Q. D. D.—Quick Demountable Detachable.

Tire and Rim Sizes

Motor Maintenance Data Cost Sheet No. 70

One of a series of weekly pages of information valuable to service men and dealer—Save this page

1916 Cars (Continued)

CAR AND MODEL	Make of Tire	Size of Tire	Style of Bead	Type of Rim	Make of Rim
Locomobile, R & M	Goodyear	37x5		Q. D. D.	Firestone
Lozier, 82 & 84		36x4½		S. S.	Stanweld
Luverne, 7-60		36x4½		S. S.	Wire wheels
Madison, T		34x4		S. S.	Stanweld
Marion, K		32x4		S. S.	
Marmion, 34	Goodrich	32x4½	Front, C ribbed Rear, C Non-skid Clincher	S. S.	Stanweld
Maxwell, 25		30x3½		Demountable	
McFarlan, 6-T & X		36x4½		Q. D. R.	Firestone
Mecca, 30		30x3½		Clincher	
Mercer, 22-72		34x4½		Q. D. R.	Howard and Stanweld
Metz, 25		32x4			
Mitchell, C-42		32x3½		Clincher	Firestone
Moline-Knight, C	Goodrich	34x4	S. S.	No. 21	Stanweld
Moline-Knight, G	Firestone	34x4	S. S.	Demountable	Firestone
Monitor, C	U. S.	35x4½	S. S.	Demountable	Firestone
Monitor, M	U. S.	32x3½	S. S.	Demountable	Goodrich
Monroe, M-2		33x4	S. S.	Demountable	Goodrich
Moon, 6-40		30x3		Clincher	Jackson
Moon, 6-30	U. S.	34x4	Chain	S. S.	Stanweld
Morse, D	U. S.	33x4	Chain	No. 21	Stanweld
		35x5			
Nash, 4-462		34x4		S. S.	Stanweld
Nash 6-661		35x4½		S. S.	Stanweld
National, A C & A D	Opt	34x4½	Clincher	Q. D.	Firestone
Oakland, 50	Goodyear	34x4½	S. S.	Demountable	Baker
Oakland, 32-B	Fisk	34x4½	S. S.	Demountable	Baker
Oakland, 38		33x4		S. S.	
Oldsmobile, 43 & 44		33x4		S. S.	Baker
Overland, 86		35x4½		No. 21 Dem. S. S.	Stanweld
Overland, 83 & 83-B		33x4		No. 21 Dem. S. S.	Stanweld
Overland, 75		31x4		Dem. Clincher	Stanweld
Overland, 84 & 84-B		34x4		No. 21 Dem. S. S.	Stanweld
		35x4½			
Owen-Magnetic		35x5		Q. D. C.	Stanweld
Packard, 125 & 135	Goodyear	34x4½			
		36x4½	Clincher	Q. D. D.	Firestone
		37x5			
Paige, 6-36 & 6-38		32x4	S. S.	S. S.	
Paige, 6-46		34x4	S. S.	S. S.	
Partin Palmer, 20		29x3½		Clincher	Perlman
Partin Palmer, 8-45		33x4			
Partin Palmer, 32		32x3½		Clincher	Perlman
Peterson, 6-42		32x4		S. S.	Perlman
Pathfinder		35x5			
Pathfinder, 8-A, B & C		35x4½		S. S.	
Peerless, 56		35x4½		S. S.	Stanweld
Phianna, M	U. S. royal cord	32x4½	S. S.	Q. Dem. S. S.	Firestone
Pierce-Arrow, 66-A-4 & 48-B-4		37x5			
Pierce-Arrow, 38-C-4		36x4½			
Pilot, 6-45	Goodyear	32x4	Diamond	Dem. S. S.	Stanweld
Premier, 6-51	Opt	36x4½	Opt	S. S.	Firestone
		34x4½			
Pullman, 6-48		36x4½		Q. D. C.	
Pullman, 4		31x4		Q. D. C.	
Regal, E		30x3½		Clincher	
Regal, D & F		33x4		Q. D.	
Reo, R & S	U. S.	34x4	S. S.	Demountable	Stanweld
Reo, M & N	U. S.	34x4½	S. S.	Demountable	Stanweld
Republic, E		36x4½		S. S.	Stanweld
Roamer	Goodyear cord	34x4	Front, ribbed Rear, A. W. T.	S. S.	Stanweld
Ross, A & C		34x4		S. S.	Detroit
Saxon, 17 & S-2		32x3½		S. S.	Stanweld

ABBREVIATIONS:

S. S.—Straight Side. Q. D. C.—Quick Demountable Clincher. Dem.—Demountable. Q. D. D.—Quick Demountable Detachable.

The Motor Car Repair Shop

Practical Maintenance Hints

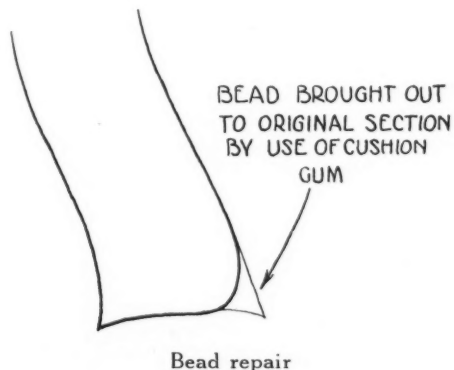
Tire Knowledge

CAREFUL BEAD REPAIRS

In putting in an inside section in a tire it is of utmost importance to finish the bead properly. After the fabric has been laid in, a section of the bead at this point instead of coming to a sharp point as shown by the light line frequently rounds off as indicated by the heavy line. There is some danger of the tube pinching in the channel which this rounded portion makes with the rim, particularly if no flap is used. The use of a flap is something that many car users neglect even in face of their extreme advisability, not to say necessity. To completely eliminate this possibility of tube pinching, the bead should be left the way it was found by filling in this section with gum and vulcanizing it in place at the same time the rest of the repair is done. In fact, regardless of the shape or condition of the bead it is always advisable to finish off a repaired section with a layer of cushion gum, thus producing a smooth surface equal to the original. Many tube troubles can be traced to neglect of this detail.

STORING TIRES IN COLUMNS

When it comes to storing tires tire racks of the familiar sort are usually accepted without question as being the best method of caring for such stock. Experience and study show, however, that this method is not always the most desirable.

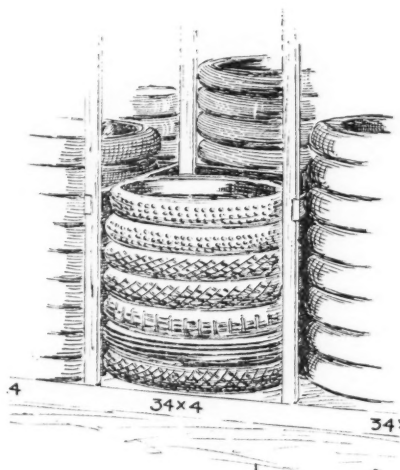


One main difficulty with tire racks is their lack of flexibility. They will hold just so many tires and no more.

You plan for space for fifty 30 by 3½ in., twenty 32 by 4 in. tires, etc., and mark your spaces accordingly, and for any one of a hundred reasons you find it desirable to carry a greater number of any given size, it throws out the arrangement of the whole rack and necessitates reallocation of all the tires in it. Even if you provide plenty of space for expansion the chances are that you will not have

allowed enough at some point or other. There are other disadvantages. Their cost is not inconsiderable, it is difficult to tell the status of the stock at a glance, it is troublesome to pull tires out of the top tier, particularly large tires.

Consequently it is often advantageous to arrange tires in vertical columns, a column for each size. Ample room for expansion is thus provided because, if



Storing tires in columns

necessary, a column may be run all the way to the ceiling. Such an arrangement allows an inventory to be made at a glance. The heights of the columns instantly reveals what sizes are low and what are not. In order to keep the columns straight and offer some support to the tires so there will be no danger of them listing it is worth while to use a row of 2 by 4's between each two rows of tires. The 2 by 4's also serve to keep the columns correctly spaced.

SOAPSTONE PAINT

It is difficult to induce the owner of an automobile to apply soapstone to the inside of a casing before mounting it. Consequently many tubes are ruined and much grief results for which the tire man is blamed, especially if he has just repaired the tube or repaired or retreaded the tire. To obviate this difficulty it is desirable to soapstone every tire which leaves the shop. Simply to dust the soapstone in is to follow a haphazard method which does not uniformly coat the surface and usually results in too much or too little soapstone being present.

The ideal method is to make a paint of gasoline and soapstone, about two handfuls of soapstone to a gallon of gasoline, then add half a pint of vulcan-

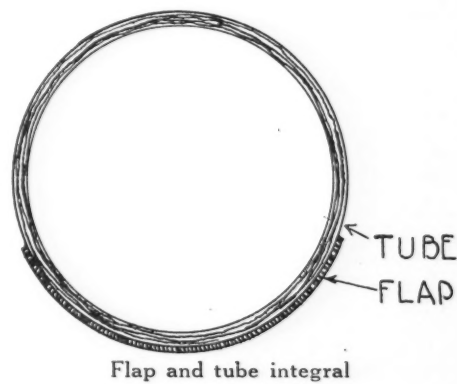
izing cement to make the soapstone adhere better to the tire. The mixture should be kept covered when not in use and should always be stirred before using as the soapstone settles. Although the cement is sufficient to hold the soapstone together it is not enough to interfere with the function of the soapstone as a lubricant to keep tire and tube from sticking. The interior of a tire when thus painted looks very much like a new tire. To further insure against tire trouble it is advisable to paint tubes the same way.

BUFFING NAILS

When buffing a tire preparatory to retreading care should be taken to look for sparks, for a stream of sparks is an indication of a nail. If this is not removed it will surely cause a puncture, sometime after the tire is retreaded and back on the car again. The stream of sparks is a sure sign and should be watched for.

FLAP AND TUBE INTEGRAL

Where a tube is used repeatedly in mounting many tires, as is sometimes necessary in retreading work, it is worth while to protect the tube by cementing a flap to it. Ordinary cold cure cement is all right for this purpose. Care should be taken to apply the flap smoothly to the tube.



ADJUSTABLE TIRE SUPPORT

When repairing the inside of a tire casing it is customary to hang the tire on a hook so it just clears the surface of the repair table. However, in order to accommodate tires of different sizes it is desirable to have this hook adjustable and so it should be attached to a chain which is passed over a pulley. The free end of the chain is hooked into itself and the height of the tire may thus be adjusted by changing the point at which this free end is attached.

Motor Age Monthly Passenger Car Specification Tables

These prices apply to five and seven-passenger models only—These tables are revised and brought up to date monthly

Name and Model	Seating Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. H. P.	Carburetor	Fuel Feed	Clutch	Gearset	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Volts	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model	
Allen 43	5	\$ 1495	110	32x4	Miller	3 1/2 x 5	Own	4	19.6	1-Ström.	Vacuum	B. and B.	Own	Detroit	Columbia	Ditweiler	Stewart	Firestone	6-8	90	Presl.	A-L	A-L	A-L	.....	6-8	Allen 43
American Beauty	5	2150	121	33x4	Firestone	3 1/2 x 4 1/2	Cont.	6	25.35	1 1/2-Ray.	Vacuum	B. and B.	Detroit	Acme	Tinken	Standard	Warner	Firestone	6	110	Willard	West.	West.	A-K	.....	6	American Beauty
Anderson Series 30	7	1850	120	32x4	Goodrich	3 1/2 x 4 1/2	Cont.	6	25.35	Ray.	Vacuum	B. and B.	Durston	Ther-H	Salisbury	Jacox	Stewart	Firestone	6	90	Willard	Remy	Remy	Remy	.....	6	Anderson Series 30
Apperson Anniversary	7	4000	130	34x4 1/2	U. S.	3 1/2 x 5	Own	8	33.80	1 1/2-John.	Vacuum	Own	Own	Sterling	Own	Own	V. Sicklen	Firestone	6	110	Willard	Bijur	Bijur	Bijur	.....	6	Apperson Anniversary
Apperson 8-20	7	2950	130	34x4 1/2	Goodyear	3 1/2 x 5	Own	8	33.80	1 1/2-John.	Vacuum	Own	Own	Sterling	Own	Own	V. Sicklen	Firestone	6	110	Willard	Bijur	Bijur	Bijur	.....	6	Apperson 8-20
Auburn 6-39	5	1795	120	32x4	Goodrich	3 1/2 x 4 1/2	Cont.	6	25.35	1-Ray.	Vacuum	B. and B.	G-L	Hart.	Col.	Jacox	Stewart	Firestone	6	80	Willard	Remy	Remy	Remy	.....	6	Auburn 6-39
Beggs 6	5	1630	120	32x4	Goodrich	3 1/2 x 4 1/2	Cont.	6	25.35	1-Ström.	Vacuum	B. and B.	Detroit	Arvac.	Tinken	Ditweiler	Stewart	Firestone	6	100	Willard	A-L	A-L	A-L	.....	6	Beggs 6
Bell	5	1395	114	31x4	Miller	3 1/2 x 4 1/2	G. B. & S.	4	22.50	1-Ström.	Vacuum	Own	Muncie	Hart	Peru	Warner	Stewart	Firestone	6	90	Phila.	A-L	A-L	A-K	.....	6	Bell
Biddle B	4	3750	121	32x4	Firestone	3 1/2 x 5 1/2	Buda	4	22.50	1 1/2-Ray.	Vacuum	Warner	Warner	Spier	Stan-Par	Gemmer	Warner	Firestone	6	90	Phila.	G. & D.	G. & D.	G. & D.	.....	6	Biddle B
Bour Davis 20	5	1750	118	32x4	Goodyear	3 1/2 x 4 1/2	Cont.	6	25.35	1-Ström.	Vacuum	B. and B.	Detroit	Mechanics	Salisbury	C. A. S.	Stewart	Perfman	12	125	Willard	Remy	Remy	Remy	.....	6	Bour Davis 20
Brewster	4	8100	125	34x4 1/2	Kelly-S	4x5 1/2	Own	4	25.60	1-Ström.	Vacuum	Own	Own	Own	Own	Own	Stewart	Firestone	6	80	Presl.	A-L	A-L	U. S. L.	.....	6	Brewster
Briscoe 4-34	5	1495	118	32x4	Goodyear	3 1/2 x 4 1/2	Own	6	27.34	Mar.	Vacuum	Own	Own	Spier	Own	Own	Stewart	Own	6	60	U. S. L.	Delco	Delco	Delco	.....	6	Briscoe 4-34
*Buick H-45	5	1495	118	32x4	Goodyear	3 1/2 x 4 1/2	Own	6	27.34	Mar.	Vacuum	Own	Own	Spier	Own	Own	Stewart	Own	6	60	U. S. L.	Delco	Delco	Delco	.....	6	*Buick H-45
*Cadillac 57	7	3490	125	35x5	Goodyear	3 5/8 x 5 1/2	Own	8	31.25	1 1/2-Ray.	Pressure	Own	Own	Spier	C-Timk.	Own	V. Sicklen	Kelsey	6	.....	Exide	Delco	Delco	Delco	6-3	6	*Cadillac 57
Cameron 55	5	2000	118	32x4	Goodyear	2 1/2 x 4 1/2	Own	6	29.40	1-Ray.	Vacuum	B. and B.	Own	Arco	Col.	Jacox	V. Sicklen	Firestone	6	125	Willard	Bijur	Bijur	Delco	.....	6	Cameron 55
Case V	7	2400	126	34x4 1/2	Goodyear	3 1/2 x 5 1/2	Cont.	6	29.40	1-Ray.	Vacuum	B. and B.	G-L	Arco	Col.	Jacox	V. Sicklen	Firestone	6	100	Exide	Bijur	Bijur	Delco	.....	6	Case V
Chalmers 35-C	5	1685	117	32x4	optional	3 1/2 x 4 1/2	Own	6	25.35	1-Ström.	Vacuum	Own	Own	U. M. Co.	Tinken	Own	Stewart	Kelsey	6	106	Presl.	A-L	A-L	Remy	.....	6	Chalmers 35-C
Chalmers 35-B	7	1765	122	33x4 1/2	optional	3 1/2 x 4 1/2	Own	6	25.35	1 1/2-Ray.	Vacuum	Own	Own	U. M. Co.	Tinken	Own	Stewart	Kelsey	6	106	Presl.	A-L	A-L	Remy	.....	6	Chalmers 35-B
Champion C-4	5	1250	116	32x3 1/2	Goodrich	3 1/2 x 5	Lyco.	4	19.60	1-Ray.	Vacuum	B. and B.	G-L	.....	Peru	C. A. S.	Stewart	Stanwald	6	.....	Willard	Delco	Delco	Delco	.....	6	Champion C-4
Champion S-4	5	1385	118	32x4	Goodrich	3 1/2 x 5	H-S	4	19.60	1-Ray.	Vacuum	B. and B.	G-L	.....	Peru	C. A. S.	V. Sicklen	Stanwald	6	.....	Presl.	Dyn.	Delco	A-K	.....	6	Champion S-4
Chandler	7	1895	123	33x4	Goodyear	3 1/2 x 5	Own	6	29.40	1-Ray.	Gravity	Own	Own	Warner	Own	Warner	Stewart	Peri-Jack.	6	120	Presl.	G. & D.	G. & D.	Bosch	.....	6	Chandler
Chevrolet 4-90	5	735	102	31x4	Goodyear	3 1/2 x 4 1/2	Own	4	21.76	1-Ray.	Vacuum	Own	Own	Mechanics	Own	Warner	Stewart	Peri-Jack.	6	80	Willard	A-L	A-L	Simms	.....	6	Chevrolet 4-90
Chevrolet F. B.	5	1235	110	32x4	Goodyear	3 1/2 x 5 1/2	Own	6	21.76	1-Ray.	Vacuum	B. and B.	Own	Muncie	Own	Ditweiler	V. Sicklen	Stanwald	6-8	120	Willard	A-L	A-L	Simms	.....	6	Chevrolet F. B.
Cleveland 40	5	1385	112	32x4	Goodyear	3 1/2 x 4 1/2	Own	6	21.76	1-Ray.	Vacuum	B. and B.	Own	Muncie	Own	Ditweiler	V. Sicklen	Stanwald	6	94	Presl.	G. & D.	G. & D.	Bosch	.....	6	Cleveland 40
Climber 4-40	5	1465	112	32x4	Goodyear	3 1/2 x 5	Cont.	4	16.90	1-Ström.	Vacuum	B. and B.	Own	Muncie	Own	Warner	Stewart	Jaxon	6	100	Willard	West.	West.	A-K	.....	6	Climber 4-40
Climber 6-50	7	2395	127	34x5	Goodyear	3 1/2 x 5 1/2	North.	8	39.20	1-John.	Vacuum	B. and B.	North.	Spier	Tinken	Col.	Stewart	Jaxon	6	80	Willard	West.	West.	Delco	.....	6	Climber 6-50
Cole Aero Eight 870	7	2550	127	32x5	Firestone	3 1/2 x 4 1/2	Cont.	8	39.20	1-John.	Vacuum	B. and B.	North.	Spier	Tinken	Col.	Stewart	Jaxon	6	80	Willard	West.	West.	Delco	.....	6	Cole Aero Eight 870
Columbia C	5	1695	115	32x4	Firestone	3 1/2 x 5 1/2	Lyco.	4	25.35	1-Ström.	Vacuum	B. and B.	Muncie	Spier	Tinken	Col.	Stewart	Firestone	6	50	Presl.	Delco	Delco	A-K	.....	6	Columbia C
Comet C-53	5	1395	117	32x4	Firestone	3 1/2 x 5 1/2	Lyco.	4	19.60	1-Ray.	Vacuum	B. and B.	Covert	Ther-H	Peru	Gemmer	Stewart	Firestone	6	80	Exide	Dyn.	Dyn.	Wagner	.....	6	Comet C-53
Commonwealth 4-40	5	2150	125	33x4 1/2	Goodrich	3 1/2 x 5 1/2	Cont.	6	25.35	1-Ström.	Vacuum	B. and B.	G-L	Detroit	Peru	Gemmer	Stewart	Stanwald	6	105	Presl.	Dyn.	Dyn.	A-K	.....	6	Commonwealth 4-40
Crow-Ekhart L-55-4	5	1295	117	32x3 1/2	Firestone	3 1/2 x 5 1/2	Lyco.	4	19.60	1-Ray.	Vacuum	B. and B.	Covert	Ther-H	Peru	Gemmer	Stewart	Firestone	6	80	Exide	Dyn.	Dyn.	Wagner	.....	6	Crow-Ekhart L-55-4
Crow-Ekhart H-55-6	5	1545	117	33x4	Firestone	3 1/2 x 5 1/2	Ruten.	4	24.03	1-Ray.	Vacuum	B. and B.	Covert	Ther-H	Peru	Gemmer	Stewart	Firestone	6	120	Willard	Delco	Delco	Wagner	.....	6	Crow-Ekhart H-55-6
Cunningham V-3	7	4500	132	34x4 1/2	optional	3 1/2 x 5 1/2	Own	8	45.00	1 1/2-Ray.	Vacuum	B-L	Own	Spier	Tinken	Gemmer	Warner	Jaxon	6	145	Willard	Delco	Delco	Wagner	.....	6	Cunningham V-3
Daniels D	5	1685	112	32x4	Goodyear	3 1/2 x 4 1/2	Own	8	39.20	1-Ray.	Pressure	Own	Own	Spier	Tinken	Gemmer	Warner	Jaxon	6	80	Exide	Dyn.	Dyn.	Wagner	.....	6	Daniels D
Davis 51	5	1465	112	32x4	Goodrich	3 1/2 x 4 1/2	Cont.	6	25.35	1 1/2-Ray.	Vacuum	B. and B.	Warner	Spier	Tinken	Gemmer	Warner	Jaxon	6	80	Exide	Dyn.	Dyn.	Wagner	.....	6	Davis 51
Dixie Flyer H-S-50	5	1085	114	32x3 1/2	Fisk	3 1/2 x 4 1/2	H-S	4	16.9	1-Ström.	Vacuum	B. and B.	G-L	Ther-H	Peru	C. A. S.	V. Sicklen	Standard	6	80	Willard	Delco	Delco	Wagner	.....	6	Dixie Flyer H-S-50
Dodge Brothers	5	1085	114	32x3 1/2	optional	3 1/2 x 4 1/2	Own	4	24.03	1-Ray.	Vacuum	Own	Own	Ther-H	Peru	C. A. S.	V. Sicklen	Standard	6	80	Willard	Delco	Delco	Wagner	.....	6	Dodge Brothers
Dorris 6-80	7	4350	132	33x5	Goodyear	3 1/2 x 5 1/2	Own	6	38.40	1-Ström.	Vacuum	Warner	Warner	Spier	Tinken	Roes	J. Man.	Own	12	103	Willard	N. E.	N. E.	Bosch	.....	6	Dorris 6-80
Dort 15	5	985	103 1/2	30x3 1/2	Goodyear	3 1/2 x 5	D-Lyco.	4	19.60	1-Ray.	Vacuum	Own	Own	Mechanics	Flint	Jacox	Stewart	Cleveland	6	95	U. S. L.	West.	West.	West.	.....	6	Dort 15
du Pont A	5	124	124	32x4 1/2	Goodyear	3 1/2 x 5 1/2	Own	4	19.60	1-Ray.	Vacuum	Own	Own	Mechanics	Flint	Jacox	Stewart	Cleveland	6	95	U. S. L.	West.	West.	West.	.....	6	du Pont A
Economy 6-46	5	1795	115	33x4	Firestone	3 1/2 x 4 1/2	Cont.	6	25.35	1-Ray.	Vacuum	B. and B.	Durston	Peters	Salisbury	Ditweiler	Stewart	Firestone	6	90	Willard	A-L	A-L	Conn.	.....	6	Economy 6-46
Elcar 6	5	1595	116	33x4	Firestone	3 1/2 x 4 1/2	Cont.	6	25.35	1-Ray.	Vacuum	B. and B.	Durston	Peters	Salisbury	C. A. S.	Stewart	Stanwald	6	90	Willard	Delco	Delco	Delco	.....	6	Elcar 6
Elcar 4	5	1395	116	33x4	Firestone	3 1/2 x 5	Lyco.	4	19.60	1-Ray.	Vacuum	B. and B.	Durston	Peters	Salisbury	C. A. S.	Stewart	Stanwald	6	90	Willard	Delco	Delco	Delco	.....	6	Elcar 4

Engines—Ruten, Rutenber, Cont., Continental; Weid, Weidely; North, Northway; H-S, Herschel-Spilmann; Lyco, Lycoming; D-Lyco, D-Lyco; G. B. & S., Golden, Belknap & Swartz; T-McTeator-McFarlan; #, Monson or Duesenberg; R. & V., Root & Van Dervoort. Carburetor—Strom, Stromberg; Zen, Zenith; Ray, Rayfield; John, Johnson; Mar, Marvel; Sund, Sunderland; Ste, Stewart; H-K, Holley-Kingston; Neve, Newcomb; Scheb, Schaefer; Tiltot, Tiltotson; Johns, Johnston. Generator—Motor d-A-L, Auto-Lite; West, Westinghouse or Auto-Lite; W-L, Ward Leonard; Dyn, Dyneto; N. E., North East; L-N, Leese-Neville; A-C, Allis-Chalmers; Split, Splitdorf; S-H, Simms-Huff; G. & D., Gray & Davis. Ignition—A-K, Atwater-Kent; Conn, Connecticut; Eise, Eisenmann; West, Westinghouse; Will, Willard; N. E., North East; K-Remy, Kingston-Remy; Berl, Berling; Bosch-W, Bosch-Westinghouse; Split, Splitdorf. Gearset—G-L, Grant-Lees; North, Northway; B-L, Brown-Lipe. Rear Axle—Col. Columbia; W-Weas, Walker-Weas; C-Timk, Cadillac-Timken; West-Mott, Weston-Mott. Universal—Hart, Hartford; Thermoid-Hardy; U. M. Co., Universal Machine Co. Speedometer—J-Man, Johns-Mausville; V-Sicklen, Van Sicklen.

* These are specifications as of December 1919; no later specifications have been received.

Name and Model	Seating Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. H. P.	Carburetor	Fuel Feed	Clutch	Gearset	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Volts	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model
Elgin Series K	5	1485	118	33x4	optional	31x4 1/2	Falls	6	23.44	1-Ström.	Vacuum	B. and B.	Mechanics	Mechanics	Col.	C. A. S.	V. Sicklen	Firestone	6	50	Willard	Wagner	Wagner	Wagner	6	Elgin Series K
Essex A	5	1495	108 1/2	32x4	optional	31x5	Ow	4	18.23	1-Ström.	Vacuum	Ow	Ow	Spicer	Timken	Gemmer	Stewart	Kelsey	6	105	Exide	Delco	Delco	Delco	6	Essex A
Ford T	5	525	100	30x3 1/2	optional	31x4	Ow	4	22.50	1-H-K	Gravity	Ow	Ow	Ow	Ow	Ow	Stewart	.....	6	80	None	Ow	Ow	Ow	6	Ford T
Franklin 9	5	2750	115	32x4	Goodyear	31x4	Ow	6	25.35	1-Carter	Vacuum	B. and B.	Mechanics	Mechanics	W. Weiss	Ow	Stewart	Jaxon	12	60	Willard	Dyn.	A-K	A-K	12	Franklin 9
Gardner	5	1125	112	32x4	Goodyear	31x5	Ruten.	6	23.44	1-Ström.	Vacuum	B. and B.	G-L	Hart	W. Weiss	Ow	Stewart	Firestone	6	87	Willard	West.	West.	West.	15	Gardner
Geromino	5	1550	122	32x4	Goodyear	31x5	Ow	6	22.52	1-Ström.	Vacuum	B. and B.	Durston	Spicer	Columbia	C. A. S.	Stewart	Firestone	6	88	Willard	Bijur	Bijur	Bijur	6	Geromino
Grant H.	5	1082	119	32x4	optional	31x4 1/2	Walker	6	25.35	1-Ström.	Vacuum	B. and B.	Covert	Spicer	Col.	Jacox	Stewart	Kelsey	6	80	Pres.	A-L	A-L	A-L	6	Grant H.
Hanson	5	1082	119	32x4	optional	31x4 1/2	Walker	6	25.35	1-Ström.	Vacuum	B. and B.	Covert	Spicer	Col.	Jacox	Stewart	Kelsey	6	80	Pres.	A-L	A-L	A-L	6	Hanson
Harmon A-A-2	5	965	106	30x3 1/2	Miller	31x5 1/2	Cont.	4	16.90	1-Ström.	Gravity	Ow	G-L	Bloed	Adams	Levine	Stewart	Stanwell	6	80	Pres.	A-L	A-L	A-L	6-8	Harmon A-A-2
Harvard 4-20	5	850	100	28x3	Freestone	31x4 1/2	H-S	4	14.40	1-Zen.	Vacuum	B. and B.	G-L	Spicer	Col.	Parrie	Stewart	Firestone	6	80	Pres.	Wagner	Wagner	Wagner	6-3	Harvard 4-20
Hatfield A-42	7	3450	127	34x4 1/2	optional	31x5	Ow	12	36.30	1-Ray.	Vacuum	B. and B.	Ow	Arvac	Col.	Jacox	Stewart	Firestone	6	120	Willard	Dyn.	Dyn.	Conn.	6	Hatfield A-42
Haynes 46	7	2882	127	34x4 1/2	optional	31x5	Ow	6	29.40	1-Ray.	Vacuum	B. and B.	Ow	Arvac	Cw	Jacox	Stewart	Firestone	6	120	Willard	L-N	L-N	Delco	6	Haynes 46
H. C. S. Special	4	120	.....	.....	.....	31x5 1/2	Weid.	6	29.40	1-Ray.	Vacuum	B. and B.	Ow	Arvac	Cw	Jacox	Stewart	Firestone	6	120	Willard	L-N	L-N	King	6	Haynes 45
Holler 206-B	5	1082	112	32x4	Goodyear	31x4 1/2	Cnt.	6	25.35	1-Zen.	Vacuum	Fuller	Fuller	Ow	Cw	Warner	Stewart	Firestone	6	50	U. S. L.	West.	West.	West.	6	Holler 206-B
Holmes	7	2506	126	34x4 1/2	Goodyear	31x4 1/2	Cw	6	29.40	1-Newe.	Vacuum	B-L	B-L	Spicer	Timken	Gemmer	Stewart	Firestone	12	100	Willard	Dyn.	Dyn.	Delco	12	Holmes
Hudson O	7	2204	125	34x4 1/2	optional	31x5	Cw	6	29.40	1-Cw	Vacuum	Ow	Ow	Spicer	Timken	Gemmer	Stewart	Firestone	6	105	Exide	Delco	Delco	Delco	6	Hudson O
Huffman W.	5	1782	120	32x4	Firestone	31x4 1/2	Cnt.	6	25.35	Schob.	Vacuum	B. and B.	Covert	Ow	Salisbury	Diweiler	Stewart	Firestone	12	10	Willard	Dyn.	Dyn.	Conn.	6	Huffman W.
Hupmobile R-3	5	1450	112	32x4	Goodyear	31x5 1/2	Cnt.	4	16.50	1-Ström.	Vacuum	Ow	Ow	Detroit	Cw	Jacox	Stewart	Firestone	6	94	U. S. L.	West.	West.	A-K	6	Hupmobile R-3
Jackson	5	2701	121	32x4	Goodyear	31x5 1/2	Cnt.	6	25.35	1-Ström.	Vacuum	B. and B.	Covert	Ow	Salisbury	Diweiler	Stewart	Firestone	6	94	U. S. L.	West.	West.	A-K	6	Jackson
Jones 28	7	2250	126	34x4	Goodyear	31x4 1/2	Cnt.	6	29.40	1-Ray.	Vacuum	B. and B.	G-L	Arvac	Stan-Par	C. A. S.	Stewart	Firestone	6	120	Pres.	A-L	A-L	A-L	6	Jones 28
Jordan F.	5	2550	120	32x4	Goodyear	31x5 1/2	Cont.	6	25.35	1-Ström.	Vacuum	Detroit	Detroit	Spicer	Timken	Gemmer	Stewart	Firestone	6	117	Willard	Delco	Delco	Delco	6	Jordan F.
Jordan M.	5	2550	120	32x4	Goodyear	31x4 1/2	Cont.	6	25.35	1-Ström.	Vacuum	Detroit	Detroit	Spicer	Timken	Gemmer	Stewart	Firestone	6	117	Willard	Delco	Delco	Delco	6	Jordan M.
King H.	7	2582	120	32x4 1/2	optional	31x5	Ow	8	28.80	1-Ball	Vacuum	Detroit	Ow	Thor-H	Col.	Jacox	Stewart	Firestone	6	120	Pres.	West.	West.	West.	6	King H.
Kiesel	7	2772	124	32x4 1/2	Goodyear	31x5 1/2	Ow	6	26.75	1-Ström.	Vacuum	Warner	Warner	Spicer	Cw	Jacox	Stewart	Firestone	6	120	Pres.	West.	West.	West.	6	Kiesel
Klinekar 6-55-J	5	2772	124	32x4 1/2	Goodyear	31x5 1/2	Ow	6	26.75	1-Ström.	Vacuum	Warner	Warner	Spicer	Cw	Jacox	Stewart	Firestone	6	120	Pres.	West.	West.	West.	6	Klinekar 6-55-J
Lafayette	5	1900	121	33x4	.....	31x4 1/2	Cont.	6	25.35	1-Ray.	Vacuum	B. and B.	G-L	Ow	Standard	Wohlrah	Stewart	Firestone	6	90	Pres.	Wagner	Wagner	Wagner	6	Lafayette
Lexington S.	5	1082	122	32x4	optional	31x4 1/2	Cont.	6	25.35	1-Ray.	Vacuum	B. and B.	Warner	Hardy	Cw	C. A. S.	Stewart	Kelsey	6	100	Willard	G-D	G-D	Conn.	6	Lexington S.
Liberty 10-C	5	1697	117	32x4	Goodyear	31x4 1/2	Cont.	6	25.35	1-Ray.	Vacuum	B. and B.	Ow	Spicer	Cw	Gemmer	Stewart	Firestone	6	100	Willard	Wagner	Wagner	Wagner	6	Liberty 10-C
Lorraine	5	8100	142	35x5	optional	41x5 1/2	Ow	6	48.60	1-Ström.	Pressure	Ow	Ow	Ow	Timken	Ow	Stewart	Firestone	6	140	Exide	West.	West.	West.	6	Lorraine
Malcolm B.	5	1425	114	32x4	Republic	31x5	H-S	4	19.60	1-John.	Vacuum	B. and B.	G-L	Arvac	Standard	Gemmer	Stewart	Firestone	6	94	U. S. L.	West.	West.	West.	6	Malcolm B.
Marmon 34	7	4650	136	32x4 1/2	optional	31x5 1/2	Falls	6	23.44	1-Ström.	Vacuum	B. and B.	Muncie	Mechanics	Peru	Jacox	Stewart	Stanwell	6	94	Willard	Bijur	Bijur	A-K	6	Marmon 34
Marshall	5	985	100	30x3 1/2	U. S.	31x4 1/2	Ow	6	23.44	1-Ström.	Gravity	Ow	Ow	Ow	Cw	Ow	Stewart	Firestone	6	162	Willard	Delco	Delco	Delco	6	Marshall
McFarlan 127	7	4500	136	35x5	Goodyear	31x4 1/2	Ow	4	21.03	1-John.	Vacuum	Ow	Ow	Ow	Ow	Ow	Stewart	Jackson	12	80	Pres.	S-H	S-H	A-K	12	McFarlan 127
Mercer Series 5	6	4750	132	32x4 1/2	optional	31x5 1/2	Ow	4	48.60	1-Ström.	Vacuum	B. and B.	B-L	Spicer	Timken	Warner	Stewart	Firestone	6	120	Willard	West.	West.	West.	6	Mercer Series 5
Meteor K. R.	4	5000	129	32x4 1/2	optional	4x6	Duesen.	4	22.50	1-Ball	Vacuum	Ow	Ow	Spicer	Ow	Warner	Stewart	Howard	6	182	Willard	West.	West.	West.	6	Meteor K. R.
Metz Master 6	5	1950	120	32x4	Goodyear	31x5	Ruten.	6	23.44	1-Ström.	Vacuum	B. and B.	B-L	Hart	Timken	Gemmer	Stewart	Firestone	6	110	Willard	West.	West.	West.	6	Metz Master 6
Mitchell E-40	5	120	33x4	.....	.....	31x5	Ow	6	25.35	1-Ray.	Vacuum	B. and B.	Ow	Ow	Ow	Ow	Stewart	Stanwell	6	94	Willard	West.	West.	West.	6	Mitchell E-40
Moline-Knight L.	5	2000	118	34x4	optional	31x5	Ow	4	25.50	1-Ström.	Vacuum	B. and B.	Warner	Spicer	Timken	Jacox	Stewart	Firestone	6	117	Willard	West.	West.	West.	6	Moline-Knight L.
Moline-Knight G	7	2500	122	35x4 1/2	optional	4x6	Ow	4	25.50	1-Ström.	Vacuum	B. and B.	Warner	Spicer	Timken	Jacox	Stewart	Firestone	6	117	Willard	West.	West.	West.	6	Moline-Knight G
Monitor M & O.	5	1205	115	32x3 1/2	Miller	31x4 1/2	Cont.	6	25.35	1-Ström.	Vacuum	B. and B.	Warner	Spicer	Timken	Jacox	Stewart	Firestone	6	117	Willard	West.	West.	West.	6	Monitor M & O.
Monroe S-9	5	1885	122	32x4	Goodyear	31x4 1/2	Cont.	4	16.90	1-Zen.	Vacuum	B. and B.	Mechanics	Ow	Stanwell	C. A. S.	Stewart	Firestone	6	110	Pres.	Dyn.	Dyn.	Conn.	6	Monroe S-9
Moon Victory	5	1885	122	32x4	Goodyear	31x4 1/2	Cont.	4	16.90	1-Zen.	Vacuum	B. and B.	Mechanics	Ow	Stanwell	C. A. S.	Stewart	Firestone	6	110	Pres.	Dyn.	Dyn.	Conn.	6	Moon Victory
Moore 6-68	7	2750	125	33x5	Miller	31x4 1/2	Cont.	6	29.40	1-Ray.	Vacuum	B. and B.	B-L	Spicer	Timken	Warner	Stewart	Firestone	6	110	Exide	Delco	Delco	Delco	6	Moore 6-68
Moore 30	5	1095	108	30x3 1/2	Firestone	31x5 1/2	Cont.	4	14.40	1-Mar.	Vacuum	B. and B.	G-L	U. P.	Peru	Diweiler	Stewart	Firestone	6	80	Willard	Delco	Delco	Delco	6	Moore 30
Nash 681	5	121	33x4	optional	31x5 1/2	31x5 1/2	Ow	4	25.35	1-Mar.	Vacuum	B. and B.	Ow	Ow	Ow	Ow	Stewart	Firestone	6	100	Willard	Wagner	Wagner	Wagner	6	Nash 681
Nash 682	7	127	34x4 1/2	optional	31x5 1/2	31x5 1/2	Ow	6	25.35	1-Mar.	Vacuum	B. and B.	Ow	Ow	Ow	Ow	Stewart	Firestone	6	100	Willard	Wagner	Wagner	Wagner	6	Nash 682

Engines—Ruten, Rutenber, Cont., Continental; Weid., Weidely; North, Northway; H.S., Herschell-Spillman; Lyco, Lycoming; D-Lyco, Dort-Lycoming; G. B. & S., Golden, Belknap & Swartz; T-McF., Teetor-McFarlan; J. Man, Johnson; Root & Van Dervoort, Carburetor—Strom, Stromberg; Zen., Zenith; Ray, Rayfield; John, Johnson; Mar., Marvel; Sund, Sunderman; Stew., Stewart; H-K, Holley-Kington; Newe, Newcomb; Schob., Schobler; Tillo, Tilloston; Johns, Johnston. Generator and Motor—A-L, Auto-Lite; West, Westinghouse or Auto-Lite; W-L, Ward Leonard; Dyn., Dyneto; N. E., North East; L-N, Leese-Neville; A-C, Allis-Chalmers; Split, Splittorf; S-H, Simms-Huff; G. & D., Gray & Davis. Ignition—A-K, Atwater-Kent; Conn., Connecticut; Esce, Eschemann; West, Westinghouse; Will, Willard; N. E., North East; K-Remy, Kingston-Remy; Berl., Berlin; Bosch-W., Bosch-Westinghouse; Split, Splittorf. Gearset—G-L, Grant-Less; North, Northway; B-L, Brown-Lipe. Rear Axle—Col., Columbia; W-Weiss, Walker-Weiss; C-Timk., Cadillac-Timken; West-Mott, Weston-Mott. Universals—Hart, Hartford; Ther-H., Thermo-Hardy; U. M. Co., Universal Machine Co. Speedometer—J-Man, Johns-Manville; V-Sicklen, Van Sicklen.

* These are specifications as of December, 1919; no later specifications have been received.

Motor Age Monthly Passenger Car Specification Tables

These prices apply to five and seven-passenger models only—These tables are revised and brought up to date monthly

Name and Model	Seating Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. H. P.	Carburetor Size and Make	Fuel Feed	Clutch	Gearset	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model
National Sixlet B-B	7	3500	120	32x4	optional	31x5 1/2	Own	6	29.40	11-Ray.	Vacuum	B. and B.	B-L	Arvac	Col.	W inner	Warner	Firestone	6	110	West.	West.	Delco	6	National Sixlet BB
Nelson D. J.	5	1700	104	32x4	Goodyear	31x4 1/2	Own	4	15.63	1-Zen.	Vacuum	Own	Own	Own	Own	Own	Stewart	Keley	12	Willard	U. S. L.	U. S. I.	Bosch	12	Nelson D. J.
Noma 1-B	4	2000	128	32x4	Goodyear	31x4 1/2	Cont.	6	25.35	11-Zen.	Vacuum	B. and B.	Detroit	Arvac	Timken	Lavine	Stewart	Keley	6	104	Willard	Delco	Delco	6	Noma 1-B
Oakland 34-C	5	1075	115	32x4	Goodyear	29 1/2 x 4 1/2	Own	6	18.99	1-Mar.	Vacuum	Own	Own	Arvac	Timken	Saginaw	Stewart	Jaxon	6	85	Prent.	Remy	Remy	6	Oakland 34-C
Oldsmobile 37-A	5	1395	112	32x4	Goodyear	29 1/2 x 4 1/2	Own	6	18.99	11-John.	Vacuum	Own	Warner	Arvac	West-Mott	Jacob	Stewart	Jaxon	6	80	Willard	Remy	Remy	6	Oldsmobile 37-A
Oldsmobile 45-B	7	1875	120	33x4	Goodyear	29 1/2 x 4 1/2	Own	8	26.45	11-Ball.	Vacuum	Own	Warner	Arvac	West-Mott	Jacob	Stewart	Jaxon	6	80	Willard	Delco	Delco	6	Oldsmobile 45-B
Olympian 45	5	1240	112	32x3 1/2	Miller	31x4 1/2	Own	4	16.50	11-Strom.	Gravity	B. and B.	Own	Arvac	Peru	Warner	Stewart	Perman	6	80	U. S. L.	A-L	A-L	6	Olympian 45
Overland 4	5	845	100	30x3 1/2	Fisk	31x4	Own	4	18.23	1-Tillot.	Pressure	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	80	U. S. L.	A-L	A-L	6	Overland 4
Owen-Magnetic W-42	7	5500	142	35.5	optional	35x5	Weid.	12	43.20	Own	Pressure	Own	Own	Arvac	Arvac	Own	Warner	Firestone	24	Willard	Own	Own	Bosch	28	Owen-Magnetic W-42
Packard 3-25	7	1335	136	35x5	optional	35x5	Own	12	43.20	Own	Pressure	Own	Own	Arvac	Arvac	Own	Warner	Firestone	6	120	Willard	Biur	Biur	7	Packard 3-25
Packard 3-35	7	1595	119	32x4	optional	31x5 1/2	Own	6	23.44	1-Strom.	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	120	Willard	Biur	Biur	7	Packard 3-35
Paige 6-42	7	2195	127	33x4 1/2	optional	31x5 1/2	Cont.	6	29.40	11-Ray.	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	108	Willard	G. & D.	G. & D.	6	Paige 6-42
Paterson 6-47	7	1725	120	33x4	optional	31x5 1/2	Cont.	6	25.35	11-Strom.	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	108	Willard	G. & D.	G. & D.	6	Paterson 6-47
Peerless Series 6	7	2100	125	34x4 1/2	Goodyear	31x5 1/2	Own	8	33.80	11-Ball.	Vacuum	B-L	Own	Arvac	Arvac	Own	Warner	Firestone	6	125	Willard	A-L	A-L	6	Peerless Series 6
Phaenna R	5	800	125	32x4 1/2	U. S.	31x5 1/2	Own	4	24.70	11-Strom.	Vacuum	Own	Own	Arvac	Arvac	Own	Warner	Firestone	6	80	Willard	A-L	A-L	6	Phaenna R
Piedmont 4-20	5	1695	122	32x4	Firestone	31x5 1/2	Own	4	19.60	1-Carter	Pressure	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	90	Willard	Dico	Dico	6	Piedmont 4-20
Piedmont 6-40	7	7250	134	34x4 1/2	Goodyear	31x5 1/2	Cont.	6	25.35	11-Strom.	Pressure	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	100	Willard	West.	West.	6	Piedmont 6-40
Pierce-Arrow 38	7	7750	142	35x5	Goodyear	31x5 1/2	Own	6	48.60	Own	Pressure	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	100	Willard	West.	West.	6	Pierce-Arrow 38
Pierce-Arrow 48	7	16500	120	32x4	Miller	31x5 1/2	Own	6	34.18	2-Zen.	Pressure	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	115	Willard	N. E.	N. E.	6	Pierce-Arrow 48
Pilot 4-45	5	6750	142	35x5	U. S.	31x5 1/2	Own	4	34.18	2-Zen.	Pressure	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	115	Willard	N. E.	N. E.	6	Pilot 4-45
Premier 6-D	7	4300	126	32x4 1/2	Firestone	31x5 1/2	Own	6	27.34	11-John.	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	115	Willard	N. E.	N. E.	6	Premier 6-D
Reo T-6	5	1650	120	33x4	U. S.	31x5 1/2	Own	6	24.3	11-Ray.	Vacuum	Own	Own	Arvac	Arvac	Own	Warner	Firestone	6	120	Willard	West.	West.	6	Reo T-6
Roamer 6-54	7	4250	131	32x4 1/2	optional	41x6	Monson	6	30.63	11-Strom.	Vacuum	B-L	Own	Arvac	Arvac	Own	Warner	Firestone	6	117	Willard	Wagner	Wagner	6	Roamer 6-54
R & V Knight J	7	3150	127	32x4 1/2	Goodyear	31x5 1/2	Cont.	6	29.40	11-Strom.	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	117	Willard	Wagner	Wagner	6	R & V Knight J
R & V Knight R	5	2150	115	32x4	optional	31x5 1/2	Own	6	29.40	11-Schob.	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	117	Willard	Wagner	Wagner	6	R & V Knight R
Saxon Y-18	5	1195	112	32x3 1/2	Goodyear	21 1/2 x 4 1/2	Cont.	6	19.84	1-Strom.	Vacuum	Own	Own	Arvac	Arvac	Own	Warner	Firestone	6	80	Willard	Delco	Delco	6	Saxon Y-18
Sayers Six	5	1795	118	32x4	Goodyear	31x4 1/2	Cont.	6	25.35	1-Zen.	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	85	Prent.	Remy	Remy	6	Sayers Six
Scipio-Booth B-39	5	1425	115	32x4	Goodyear	29 1/2 x 4 1/2	North.	6	18.99	1-Mar.	Vacuum	North.	Own	Arvac	Arvac	Own	Warner	Firestone	6	85	Prent.	Remy	Remy	6	Scipio-Booth B-39
Seneca L	5	185	108	30x3 1/2	Miller	31x4 1/2	Le Roi	4	15.63	1-Schob.	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	88	Prent.	A-C	A-C	6	Seneca L
Singer 20	7	5500	108	33x5	Goodyear	21x5	Weid.	12	39.68	11-Strom.	Vacuum	Covert	Covert	Arvac	Arvac	Own	Warner	Firestone	6	162	Willard	West.	West.	6	Singer 20
Skilton	5	1245	111	32 1/2	optional	31x5 1/2	Lycoming	4	19.60	1-Carter	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	85	Prent.	West.	West.	6	Skilton
Spacke S-20	5	205	90	28x3	U. S.	31x3.67	Own	8	33.20	11-Zen.	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	160	Willard	West.	West.	6	Spacke S-20
Standard 8-1	7	3000	127	34x4 1/2	optional	31x5 1/2	Own	6	25.35	11-Zen.	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	160	Willard	West.	West.	6	Standard 8-1
Stearns SKL-4	5	2850	122	34x4 1/2	Goodyear	31x5 1/2	Own	6	25.35	11-Zen.	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	116	U. S. L.	A-L	A-L	12	Stearns SKL-4
Stevens 80	6	2050	122	33x4 1/2	Fisk	31x4 1/2	Own	4	22.44	11-Tillot.	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	80	Willard	Wagner	Wagner	6	Stevens 80
Studebaker E-J	5	1435	112	32x4	Goodyear	31x4 1/2	Own	6	29.40	11-Strom.	Vacuum	Own	Own	Arvac	Arvac	Own	Warner	Firestone	6	80	Willard	Wagner	Wagner	6	Studebaker E-J
Studebaker E-G	7	2135	126	33x4 1/2	Goodyear	31x5 1/2	Own	6	29.40	11-Strom.	Vacuum	Own	Own	Arvac	Arvac	Own	Warner	Firestone	6	80	Willard	Wagner	Wagner	6	Studebaker E-G
Studebaker E-H	5	1685	119	32x4	Goodyear	31x5 1/2	Own	6	29.40	11-Strom.	Vacuum	Own	Own	Arvac	Arvac	Own	Warner	Firestone	6	130	Willard	Wagner	Wagner	6	Studebaker E-H
Stutz H	6	3350	130	32x4 1/2	optional	31x6	Own	4	30.63	11-Strom.	Pressure	Own	Own	Arvac	Arvac	Own	Warner	Firestone	6	100	Willard	Wagner	Wagner	6	Stutz H
Templar A-445	5	2685	118	32x4	optional	31x5 1/2	Own	4	18.23	11-Strom.	Vacuum	B. and B.	Detroit	Arvac	Arvac	Own	Warner	Firestone	6	100	Willard	Wagner	Wagner	6	Templar A-445
Tulsa E	5	1171	117 1/2	33x4	.....	5x3 1/2	H. C.	4	19.60	1-Miller	Vacuum	B. and B.	Own	Arvac	Arvac	Own	Warner	Firestone	6	80	Exide	Dyn.	Dyn.	6	Tulsa E

Engines—Ruten, Rutenber; Cont., Continental; Weid, Weidely; North, Northway; H.S., Herschell-Spliman; Lyco, Lycoming; D-Lyco, Dort-Lycoming; G. B. & S., Golden, Belknap & Swartz; T-McTector-McFarlan; #, Monson or Duesenberg; R. & V., Root & Van Dervoort. Carburetor—Strom, Stromberg; Zen, Zenith; Ray, Rayfield; John, Johnson; Mar, Marvel; Sund, Sunderman; Ste, Stewart; H-K, Holley-Kington; Newc, Newcomb; Schob, Schobler; Tiltot, Tiltoton; Johns, Johnston. Generator and Motor—A-L, Auto-Lite; West, Westinghouse or Auto-Lite; W-L, Ward Leonard; Dyn, Dyno; N. E., North East; L-N, Leeco-Neville; A-C, Allis-Chalmers; Split, Splitdorf; S-H, Simms-Huff; G. & D., Gray & Davis. Ignition—A-K, Avater-Kent; Conn., Connecticut; Eise, Eismann; West, Westinghouse; Will, Willard; N. E., North East; K-Remy, Kingston-Remy; Berl, Berling; Bosch-W., Bosch-Westinghouse; Split, Splitdorf. Gearset—G-L, Grant-Lees; North, Northway; B-L, Brown-Lipe. Rear Axle—Col, Columbia; W-Weiss, Walker-Weiss; C-Timk, Cadillac-Timken; West-Mott, Weston-Mott. Universal—Hart, Hartford; Thermoid-Hardy; U. M. Co., Universal Machine Co. Speedometer—J-Man, John-Mansville; V-Sicklen, Van Sicklen.

*These are specifications as of December 1919; no later specifications have been received.

Name and Model	Sealing Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. HP.	Carburetor Size and Make	Fuel Feed	Clutch	Throttle	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Volts	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model
Velle 48.....	5	1755	115	32x4	Goodyear	31x4 1/2	Cont.	6	25.35	11-R. Y.	Vacuum	B. and B.	Durston	Arvac	Timken	Gemmer	V. Sicklen	Firestone	6	120	Willard	Bijur	Bijur	Bijur	6	Velle 48
Velle 34.....	5	1112	112	32x3 1/2	optional	31x4 1/2	Falls	6	23.44	Ray.	Vacuum	B. and B.	Durston	.....	Col.	Gemmer	V. Sicklen	Firestone	6	100	Willard	West.	A-K	A-K	6	Velle 34
Westcott C-38.....	5	2300	118	33x4	Firestone	31x4 1/2	Cont.	6	25.35	11-Ray.	Vacuum	B. and B.	Warner	Spicer	Timken	Gemmer	V. Sicklen	Firestone	6	80	Willard	Delco	Delco	Delco	6	Westcott C-38
Westcott C-48.....	7	2850	125	23x4 1/2	Firestone	31x5 1/2	Cont.	6	29.40	11-Ray.	Vacuum	B. and B.	B-L	Spicer	Timken	Gemmer	V. Sicklen	Firestone	6	120	U. S. L.	Delco	Delco	Conn.	6	Westcott C-48
Willye-Knight 88-4.....	7	1725	121	34x 3/4	.....	4 1/2	Own	4	27.23	11-Tillot.	Vacuum	Cwn	Own	Own	Own	Own	Warner	Stanweld	6	120	Willard	A-JL	A-JL	Bosch	6	Willye-Knight 88-4
Winton 25.....	7	3050	123	35x5	optional	31x5 1/2	Own	6	33.75	11-Strm.	Vacuum	.....	.....	.....	.....	.....	Warner	Firestone	6	120	Willard	Bijur	Bijur	Bosch	6	Winton 25

STEAM CARS

Stanley 735.....	7	3740	130	4x4	Goodyear	4-5	Own	2	none	none	none	one	Own	Warner	V. Sicklen	Firestone	6	116	Willard	Remy	None	None	6	Stanley 735
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Engines—Ruten: Rutenber: Cont., Continental; Weid., Weidely; North., Northway; H-S., Herschell-Spillman; Lyco., Lycoming; D-Lyco., Dort-Lycoming; G. B. & S., Golden, Belknap & Swartz; T-McF., Teetor-McFarlan; #, Monson or Duesenberg; R. & V., Root & Van Dervoort. **Carburetor**—Strom, Stromberg; Zen., Zenith; Ray., Rayfield; John., Johnson; Mar., Marvel; Sund., Sunderman; Stew., Stewart; H-K., Holley-Kingston; Newe., Newcomb; Scheb., Schebler; Tilot., Tiltotson; Johns., Johnston. **Generator and Motor**—A-L., Auto-Lite. **West. Westinghouse**; #, Westinghouse or Auto-Lite; W-L., Ward Leonard; Dyn., Dyneto; N. E., North East; L-N., Leece-Neville; A-C., Allis-Chalmers; Split., Splitdorf; S-H., Simms-Huff; G. & D., Gray & Davis. **Ignition**—A-K., Alwater-Kent; Conn., Connecticut; Eise., Eisemann; West., Westinghouse; Will., Willard; N. E., North East; K-Remy, Kingston-Remy; Berl., Berling; Bosch-W., Bosch-Westinghouse; Split., Splitdorf. **Gearset**—G-L., Grant-Lees; North., Northway; B-L., Brown-Lipe. **Rear Axle**—Col., Columbia; W-Weiss, Walker-Weiss; C-Timk., Cadillac-Timken; West-Mott., Weston-Mott. **Universals**—Hart, Hartford; Ther-H., Thermoid-Hardy; U. M. Co., Universal Machine Co. **Speedometer**—J-Man., Johns-Manville; V-Sicklen, Van Sicklen. —Col., Columbia; as of December, 1919; no later specifications have been received.

Engines—Ruten, Rutenber; Cont., Continental; Weid., Weidely; North., Northway; H-S., Herschell-Spillman; Lyco., Lycoming; D-Lyco., Dort-Lycoming; G. B. & S., Golden, Belknap & Swartz; T-Mcf., Teetor-McFarlan; #, Monson or Duesenberg; R. & V., Root & Van Dervoort. **Carburetor**—Strom., Stromberg; Zen., Zenith; Ray., Rayfield; John., Johnson; Mar., Marvel; Sund., Sunderland; Stew., Stewart; H-K., Holley-Kingston; Newc., Newcomb; Schob., Schobler; Tillot., Tillotson. **Generator and Motor**—A-L., Auto-Lite; West., Westinghouse; #, Westinghouse or Auto-Lite; W-L., Ward Leonard; Dyn., Dyneto; N. E., North East; L-N., Lece-Neville; A-C., Allis-Chalmers; Split., Splitdorf; S-H., Simms-Huf; G. & D., Gray & Davis. **Ignition**—A-K., Atwater-Kent; Conn., Connecticut; Eise., Eisingmann; West., Westinghouse; Will., Willard; N. E., North East; R-Remy, Kingston-Remy; Berl., Berling; Bosch-W., Bosch-Westinghouse; Split., Splitdorf. **Gearset**—G-L., Grant-Lees; North., Northway; B-L., Brown-Lipe. **Rear Axle**—Col., Columbia; W-Weiss, Walker-Weiss; C-Tink., Cadillac-Timken; West-Mott, Weston-Mott. **Universals**—Hart, Hartford; Ther-H., Thermoid-Hardy; U. M. Co., Universal Machine Co. **Speedometer**—J-Man., Johns-Manville; V-Sicklen, Van Sicklen.

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California Dealers in Meet

Parade Around Lake Leavitt Is One of Features of Gathering

Oakland, Calif., Jan. 1—The annual convention of the northern division of the California Auto Trades' association, which extended over two days, recently, was a decided success, with a registration of more than 1000 members, the territory represented being that lying between the Tehachapis and the Oregon line. Walter J. Hesse, general chairman of the association, declared that all was accomplished that had been hoped for and that more in the way of bettering conditions in the automobile industry has been done than at any previous meeting of the organization.

San Francisco dealers attended in force, the delegation from the Pacific metropolis being headed by H. J. Banta. The Sacramento County association, of which J. F. Kellogg is secretary, sent a delegation of fifty members and a similar number came from Kern County, led by Otis Hymer, of Bakersfield. The leaders of other delegations were: Frank A. Kent, of Stockton, secretary of the San Joaquin County association; Manuel King, of San Leandro; L. W. Kamm, San Luis Obispo; H. G. Van Lennep, Auburn; L. A. Bollo, Fresno; L. L. Putnam, Santa Rosa, secretary of the Sonoma County association; Charles F. Cole, Haywards; H. P. Walls, Modesto, and George E. Lacey, Salinas.

The opening day was given over largely to meetings of the various crafts, with a luncheon at which addresses were made by State President George Habersfeld, of Bakersfield; Ernest Fetter, president of the Alameda County branch; William H. Hughson, president of the San Francisco Motor Car Dealers' association, and Frank Fageol, first president of the Alameda County association. A stag smoker, with lively entertainment, brought the first day of the meeting to a close.

The feature of the second day was an automobile parade around Lake Merritt and over the Skyline boulevard to the University of California in Berkeley. The ladies accompanying the delegates were entertained by a committee headed by Mrs. Robert W. Martland and theater parties and rides on the Bay made their visit enjoyable.

Thirty delegates attended the meeting held by the body building, trimming and painting craft and chose John Rymer, chairman, and W. E. Eldredge, secretary. A committee was appointed to work out a price schedule and another to confer with dealers with regard to allied interest of the body builders and the various selling agencies. Wages to be paid employees were decided upon the basis of \$2 an hour for mechanics and \$1.50 an hour for helpers.

The meeting of battery men was well attended and Ernest E. Fetter acted as chairman, with J. A. Borkman, as secretary. The standardization of prices was discussed and will be brought about as quickly as possible. It was decided that in the future all battery cases will be branded with the stamp of the California Auto Trade association and the number of the dealer. When a battery is presented under suspicious circumstances there will be an investigation and it is believed that this will do much to stop battery thefts. Discounts between battery men and garagemen may be discontinued, unless there is a change in the present system. At present garagemen are given a discount for sending customers to battery houses, but refuse to split with battery men if they send customers to the garage.

Tire dealers, vulcanizers and repairmen met under the leadership of George F. Schmidt, of Sacramento, E. L. Hiteman acting as secretary. It was decided that in the future all tires discarded as worthless by vulcanizers and repairmen would be sawed in two to prevent various concerns from retreading them and placing them on the market as "seconds." Standardization of tire charges, with special reference to changing tires, which vary with practically every shop, were considered at length.

T. J. Tehaney, head of the State Motor Vehicle department, attended the general session and asked the members of the organization to go before the next legislature and ask that the motor law be amended to provide for an examination of applicants for licenses. He said that the new headlight law is to be strictly enforced and dealers were urged to so advise car owners.

From the Four Winds

Glimpses at the World of Motordom

Coming Motor Events

AERONAUTIC SHOWS

Chicago	Chicago Aircraft Exposition	Jan. 8 to 14
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AUTOMOBILE SHOWS

Worcester, Mass.	Worcester Automobile Dealers' Ass'n	Jan. 1 to 8
New York	National Automobile Chamber of Commerce	Jan. 3 to 10
Montreal	Grand Palais, A. Levesque, Mgr.	Jan. 10 to 17
Philadelphia	Phil. Automobile Trade Ass'n	Jan. 10 to 17
Willimantic, Conn.	State Armory	Jan. 16 to 18
Hazleton, Pa.	Chamber of Commerce	January
Topeka, Kan.	Annual Automobile Show	January
Oakland, Cal.	Alameda Trade Ass'n	Jan. 19 to 26
Cleveland, O.	Cleveland Automobile Mfrs. & Dealers' Ass'n	Jan. 17 to 24
Hartford, Conn.	Hartford Automobile Dealers' Ass'n	Jan. 17 to 24
Schenectady, N. Y.	James J. Callahan, Manager	Jan. 19 to 24
Milwaukee, Wis.	Annual Show, B. J. Ruddle, Manager	Jan. 19 to 25
Spokane, Wash.	Spokane Dealers' Automotive Show	Jan. 21 to 25
Chicago	National Automobile Chamber of Commerce	Jan. 24 to 31
Chicago	Automobile Salon	Jan. 24 to 31
Amsterdam, N. Y.	New York State Armory	Jan. 26 to 31
Kansas City	Overland Bldg., E. E. Peake, Mgr.	Jan. 31 to Feb. 6
New Brunswick, N. J.	Annual Show, W. A. Kuehn, Mgr.	Jan. 31 to Feb. 7
Minneapolis, St. Paul	Minn. Automobile Trade Ass'n	Jan. 31 to Feb. 7
Toledo, O.	Terminal Auditorium	Feb. 2 to 7
Baltimore, Md.	Automobile Show	Feb. 3 to 7
Wilmington, Del.	Hotel DuPont	Feb. 3 to 8
Charlotte, N. C.	Charlotte Automobile Trade Ass'n	Feb. 9 to 14
Greenfield, Mass.	Mass. State Armory	Feb. 9 to 14
New Haven, Conn.	Automobile Dealers' Ass'n	Feb. 9 to 14
Nashville, Tenn.	Automobile Show	Feb. 9 to 14
Salt Lake City	Automobile Show	Feb. 9 to 14
Cedar Rapids, Iowa	Automobile Show	Feb. 9 to 14
Deadwood, S. C.	Deadwood Business Club	February
Brooklyn, N. Y.	Motor Vehicle Dealers' Ass'n	Feb. 14 to 21
Detroit, Mich.	Detroit Automobile Dealers' Ass'n	Feb. 14 to 21
Buffalo, N. Y.	Buffalo Automobile Dealers' Ass'n	March 1 to 6
St. Louis	St. Louis Automobile Mfrs. & Dealers' Ass'n	Feb. 15 to 20
Manchester, N. H.	Automobile Show, Academy	Feb. 16 to 20
San Francisco	San Francisco Motor Car Dealers' Ass'n	Feb. 21 to 28
Ottawa, Canada	Motor Show	Feb. 21 to 28
Bethlehem, Pa.	Sixth Annual Show, J. L. Ellicot, Mgr.	Feb. 23 to 28
Louisville, Ky.	Louisville Automobile Dealers' Ass'n	Feb. 23 to 28
Pittsfield, Mass.	Mass. State Armory	Feb. 23 to 28
Portland, Ore.	Portland Automobile Trade Ass'n	Feb. 23 to 28
Grand Rapids, Mich.	Automobile Show	Feb. 23 to 28
Newark, N. J.	First Regiment Armory, C. E. Holgate, Mgr.	Feb. 28 to Mar. 6
Perth Amboy, N. J.	First Automobile Show	March 1 to 6
Springfield, Mass.	Springfield Automotive Dealers' Ass'n	March 1 to 7
Lyons	Automobile Show	March 1 to 8
Syracuse, N. Y.	Syracuse Automobile Dealers' Ass'n	March 1 to 6
Denver	Denver Automobile Trade Ass'n	March 2 to 6
Lancaster, Pa.	Automobile Show	March 3 to 6
Jersey City, N. J.	Automobile Show	March
Boston, Mass.	Mechanics' Bldg., C. D. Campbell, Mgr.	March 13 to 20
New Orleans	Automobile Show	March
Little Rock, Ark.	Annual Show, Liberty Hall	March 15
Oklahoma City, Okla.	Oklahoma City Dealers' Ass'n	March 15
Wilkes-Barre, Pa.	Passenger Car & Truck Show	March 15 to 22

TRUCK SHOWS

New York	National Automobile Chamber of Commerce	Jan. 3 to 10
Philadelphia	Commercial Museum	Jan. 17 to 24
Chicago	National Automobile Chamber of Commerce	Jan. 24 to 31
New Haven, Conn.	Automobile Dealers' Ass'n	Feb. 16 to 21

TRACTOR SHOWS

Wichita, Kan.	Wichita Thresher-Tractor Club	Feb. 9 to 14
Kansas City, Mo.	Kansas City Tractor Club	Feb. 16 to 21

MISCELLANEOUS CONVENTIONS AND MEETINGS

New York	Highway Transport Conference	Jan. 3
New York	Automotive Service Ass'n of New York Factory Service Managers	Jan. 5
New York	Society of Automotive Engineers	Jan. 6 to 8
Chicago	Highway Transport Conference	Jan. 24
Chicago	N. A. D. A.	Jan. 26 to 27
Atlanta, Georgia	Automobile Dealers' Ass'n Convention	Jan. 27
Atlanta, Georgia	National Ass'n of Automobile Show Managers	Jan. 27
Chicago	Society of Automotive Engineers	Jan. 28
Louisville, Ky.	Seventeenth Annual Convention American Road Build. and Eleventh National Good Roads Show	Feb. 9 to 13
Lake Charles, La.	Louisiana-Mississippi Automotive Trade Ass'n Convention	Mar. 17 to 18

Bus Drivers Forbidden to Operate—The Public Service Commission has barred Harry Haring and Allan Santre, of Easton, Pa., from operating motor 'buses in Northampton and Bucks counties, sustaining the complaint of the Philadelphia & Easton Electric Railway Co., that the respondents have been operating as common carriers in competition with the railway, without having been issued certificates of public convenience.

Detroit Fighting Car Thieves—Automobiles stolen during November totaled 268, valued at \$270,570, according to Detroit police statistics, with 197 machines reported recovered, valued at \$213,260. Accessories valued at \$4,400 were stolen and recoveries aggregated \$1,053. Nine cars, valued at \$9,950, stolen from other cities, also were recovered in Detroit. Two troops of state constabulary will be stationed on the two main roads leading from Detroit at the county line to work in conjunction with the police in apprehending thieves.

Ohio Car Registration Data—With the year practically over as far as registration of motor vehicles is concerned, the Ohio Automobile department is in a position to give approximate figures of the number of motor vehicles operated in the state. Up to December 4, the department issued licenses for 510,000 gasoline cars both in the passenger and commercial vehicle divisions. The department also issued 5000 licenses for electrics and dealers and manufacturers to the number of 3625 were registered. Thus by averaging the number of cars in use by the various dealers and manufacturers at five each it is seen that there are 533,125 motor vehicles in operation in the Buckeye state.

Many Cars Stolen in Pennsylvania—Highway Department reports show that 2049 motor cars were stolen in Pennsylvania during 1919, of which only 272 were recovered. The automobile code of 1919 provides for reports to the State authorities of all cars stolen. It is estimated that the value of the stolen cars was approximately \$2,000,000. Of the cars reported stolen, 1352 were taken after the approval of the new law, which established a penalty of \$5,000 fine and ten years in prison as the maximum. In addition to the 272 cars recovered, the State is holding under advisement seventeen cases wherein proof of ownership has not been established.

Lumbering Firm Uses Many Tractors—Wheeler & Dusenbury, a large lumbering firm in Western Pennsylvania, is employing 500 men and using farm tractors for hauling timber and for work about the plant at Endeavor, Pa. Lecture courses and motion picture entertainments are provided for the employees under the company's direction. One of the tasks of the company is to provide food for the workers and their families and the company maintains large farms for produce and stock, for this purpose. The Wheeler & Dusenbury outfit's tractors are said to have taken the place of numerous teams of horses.